


REPORT

Río Chico: A Multicomponent Site Precursor of Té Zulay

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Abstract

This report presents survey and excavation results from the site of Río Chico, located near the city of Puyo, Ecuador. Currently, Río Chico is the oldest multicomponent village-type mound site of the Pastaza drainage, one of the great rivers of the Amazon basin. It is part of a series of monumental sites in the Upper Amazon of Ecuador but is unique in the area because of its evidence of consumption of certain plants and interregional trade.

Resumen

Este informe presenta los resultados de la prospección y excavación del sitio de Río Chico, situado cerca de la ciudad de Puyo, Ecuador. Río Chico es el sitio monticular multicomponente tipo aldea más antiguo del río Pastaza, uno de los grandes afluentes de la cuenca del Amazonas. Forma parte de una serie de sitios monumentales de la Alta Amazonia, pero es único en la zona con evidencias de consumo de ciertas plantas y de intercambio interregional.

Keywords: Upper Amazon; Pastaza River; Amazonian archaeology; paleobotany

Palabras clave: Alta Amazonia; Río Pastaza; arqueología amazónica; paleobotánica

Near the city of Puyo, in the Ecuadorian Amazon, Río Chico is a multicomponent mound site of eight *tolas* (artificial earthen mounds) clustered next to the Pastaza River (Figure 1). The area is part of the surrounding Andean foothills relief (Winckell 1997) and the northern evergreen foothill forest ecosystem of the eastern Andean Mountains (MAATE 2013), with an average altitude of 906 m asl, steady rainfall, and an average temperature of 20°C. It is in a zone of Andosol soil, with nearby areas of Acrisol and Cambisol. Andosol soil is characterized by volcanic glasses and a dark-colored surface horizon (FAO/IIASA/ISRIC/ISSCAS/JRC 2012). Río Chico is a Humic Andosol, containing a large amount of organic matter. After its chance discovery in 2016 during construction of a secondary road, the site was investigated in 2018 by researchers from the Universidad Estatal Amazónica (UEA), the Museo Etnoarqueológico Municipal de Pastaza (MEMPA), and the Instituto Nacional de Patrimonio Cultural (INPC).

Four distinct zones were identified based on the concentrations of ceramic material. In Zones 1 and 2, 21 shovel test pits of 60 × 60 cm were excavated. We found cultural material, mostly ceramic sherds, in five of these zones. In Zone 3, comprising a single *tola*, two of six shovel tests revealed cultural materials. In Zone 4, material was found in one of the three shovel tests. It should be noted that the site had been previously leveled with a backhoe, which cut into some of the *tolas* and removed from 0.5 to 6.0 m of earth.

Through his work at the Sangay site near the Sangay volcano in central Ecuador, Porras (1987) initiated research on settings in the Ecuadorian Amazon with a complex social organization capable of supporting large populations. The Sangay site, later renamed the Huapula site (Salazar 2008), has also been studied by Rostain (1999) and Pazmiño (2021). Excavations of the Santa Ana-La Florida

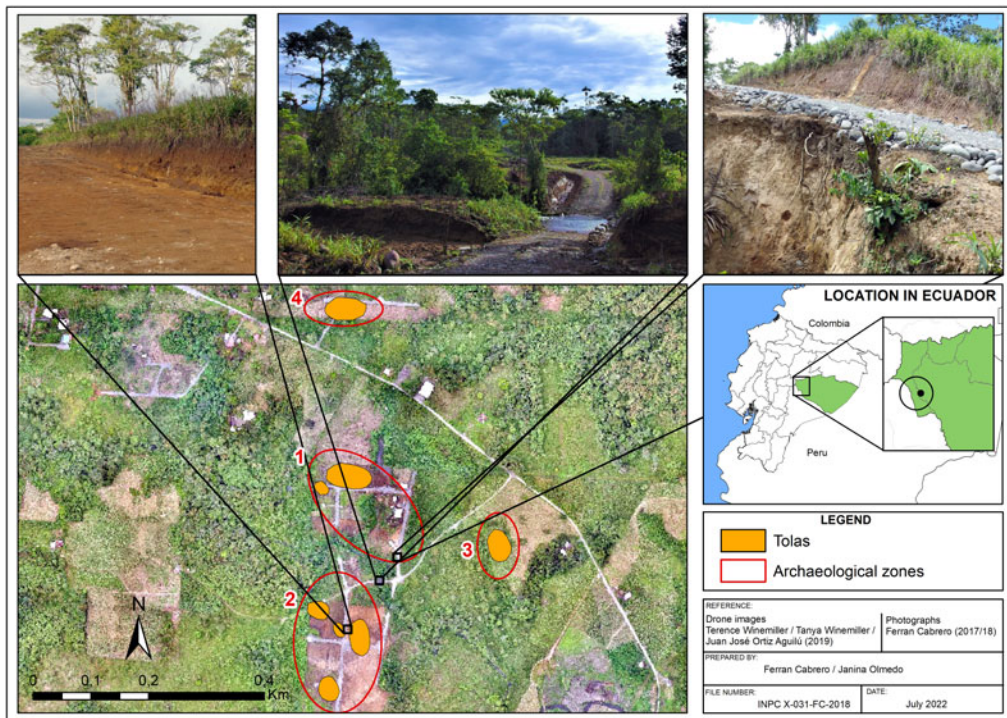


Figure 1. Río Chico site. (Color online)

(SALF) site farther south have also contributed to our understanding of the Upper Amazon past (Figure 2; Valdez 2013, 2021). SALF was occupied by the Maya-Chinchipec-Marañón culture, which was also found across the modern border in northern Peru. One important contribution to local and regional debates is the early origin and distribution of *Theobroma cacao* L. around 5300 BP (Zarrillo et al. 2018).

On the banks of the Pastaza River, about 3 km from the Río Chico site, lies the Té Zulay complex, a former tea estate whose archaeological remains were identified by Porras (1987) and then investigated more recently at the request of the INPC using lidar technology (Delgado and Vásquez 2016; Murillo 2006; Vásquez 2010; see Figure 3). This investigation determined the number of *tolas* at Té Zulay and provided radiocarbon dates that point to three periods of occupation: the Late Formative, Regional Developmental, and Integration periods. In a report on two nearby hills, Rostain and coworkers (2014) confirmed these periods by providing two earlier dates than Té Zulay (Table 1). On Colina Moravia, one of these hills, they reported new evidence for plant use in recent periods (about AD 0–1020).

Radiocarbon Dating and Analysis of Ceramic and Lithic Materials

Río Chico has at least three distinguishable cultural periods (Formative, Regional Developmental, and Integration) based on one radiocarbon date and relative dating based on ceramic styles. The Formative material was found at a depth of 3.5 m, and the only sample with absolute dating comes from charcoal (D-AMS 026562 [(3885–3607 (94.3%) / 1936–1558 (94.3%))] scattered on a cultural occupation floor, presumably from a cooking area. At approximately the same depth but about 50 m away, a secondary burial was found that contained three small vessels inside a larger pot. The Regional Developmental occupation is indicated by ceramics, including very elaborate vessel forms and sherd fragments with a variety of decorative designs. The Integration period component is dominated by the corrugated ceramic style. Pottery fragments from the last two periods were found between 0.60 m and the surface.

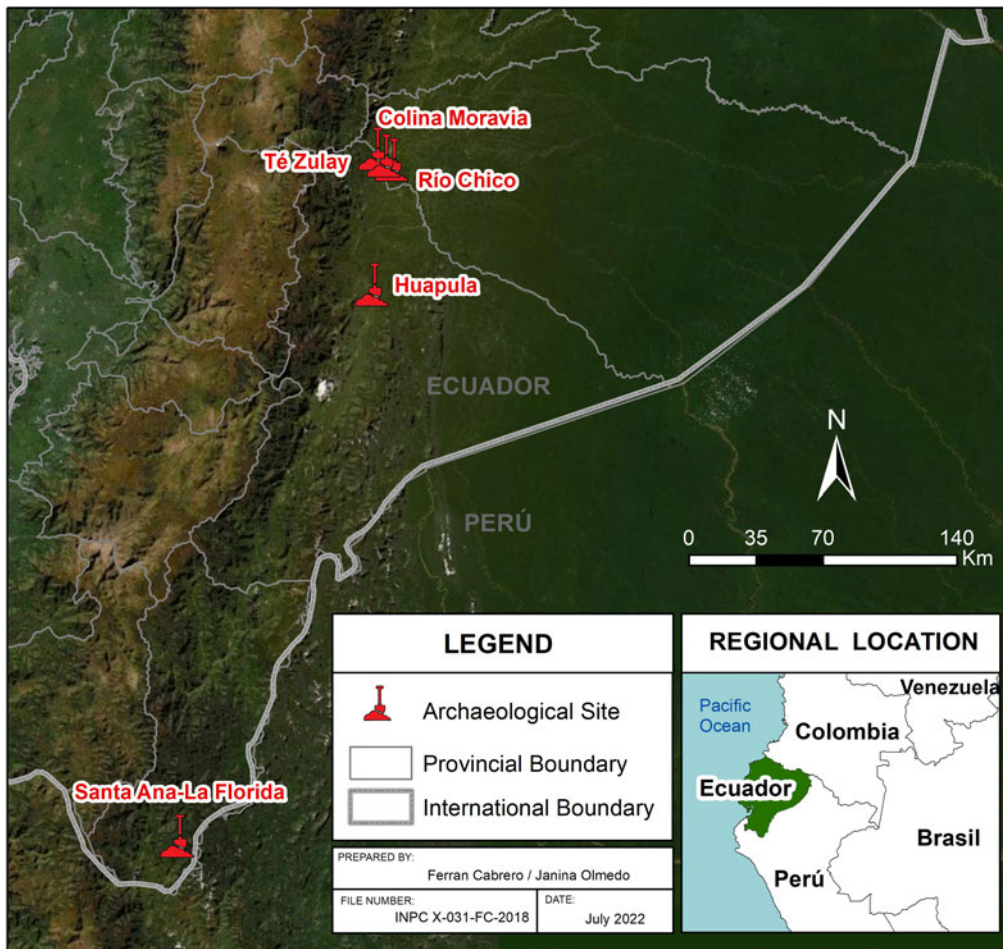


Figure 2. Archaeological sites in the Ecuadorian Amazon. (Color online)

Bearing in mind that the terrain had been leveled for different uses, most of the ceramic fragments and all the lithic material were mixed at a superficial level.

A total of 836 potsherds were recovered, of which we inventoried 691 diagnostic sherds corresponding to the four identified distribution zones of the site. Most of the fragments—which had impression, incising, and appliqué techniques; varying thicknesses of temper (from fine to medium and coarse); and paste colors ranging from dark gray to red to light brown or beige (Figure 4)—show unique characteristics for the area: wavy lines (serpentine appliqué) and botanical motifs (incised palm-shaped designs with meander or flowers).

The incised and dotted motifs, as well as some necks with fingernail printing, resemble the decorated ceramic fragments from Té Zúlay and Colina Moravia. An analysis of the estimated firing temperature was done to provide an alternative relative dating method for the more common, scattered, and mostly superficial ceramics. Three groups of ceramics were identified: (1) pottery of thick and fine paste associated with open-air firing (up to 550°C), (2) pottery of thick and fine paste associated with hole-like structures (between 600°C and 800°C), and (3) pottery of fine paste and homogeneous color that require baking in oven-like structures (hotter than 950°C; INPC 2020). These groups point to two types of pottery elaboration and could be correlated with two cultures and periods: Regional Developmental and Integration. In contrast, the finest type of ceramics and more elaborated designs in the area are associated with earlier periods.

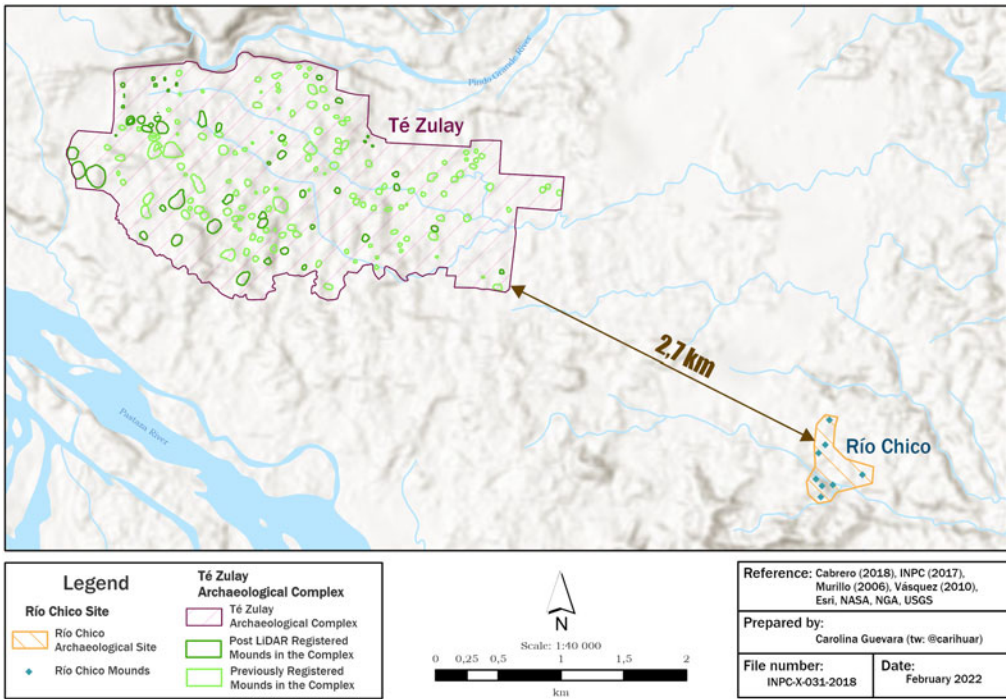


Figure 3. Té Zulay complex and Río Chico site. (Color online)

The Formative period secondary burial mentioned earlier was found by chance in Zone 1. It was associated with a coarse pot approximately 80 cm in diameter, inside of which were three smaller vessels. The period of one of these three vessels could not be determined by style (Figure 5a; 12 cm diameter), whereas the other two suggest a style related to the end of the Regional Developmental period and the beginning of the Integration period. Of these latter two, one vessel (Figure 5b; 13.8 cm diameter) has a red-orange slip, a rim with three superimposed bands, and parallel vertical incisions. The other (Figure 5c; 11.9 cm diameter) is anthropomorphic, in a clear Puruha style (around AD 300–1500) from the central Ecuadorian cordillera.

Table 1. Chronological Chart in the Upper Pastaza Valley.

Periods	Site	Lab. No.	¹⁴ C Age (yr BP)	Calibrated age (2σ cal)
Integration (AD 500–1500)	Té Zulay	Beta-284288	1080 ± 60	AD 810–1040
	Té Zulay	Beta-284282	1520 ± 50	AD 420–640
Regional Development (500 BC–AD 500)	Té Zulay	Beta-284290	1810 ± 50	AD 80–340
	Té Zulay	Beta-284281	2020 ± 90	350–300 BC
Formative (4400–500 BC)	Té Zulay	Beta-284289	2360 ± 50	720–700 BC
	Pambay	Lyon-9521	3135 ± 30	1495–1317 BC
	Colina Moravia	Beta-324360	3460 ± 30	1880–1690 BC
	Río Chico	D-AMS 026562	3516 ± 27	1936–1558 BC

Sources: Approximate periods for Ecuador adapted from Meggers (1966) and Marcos (2003). Data from Vásquez (2010) and Rostain and colleagues (2014).

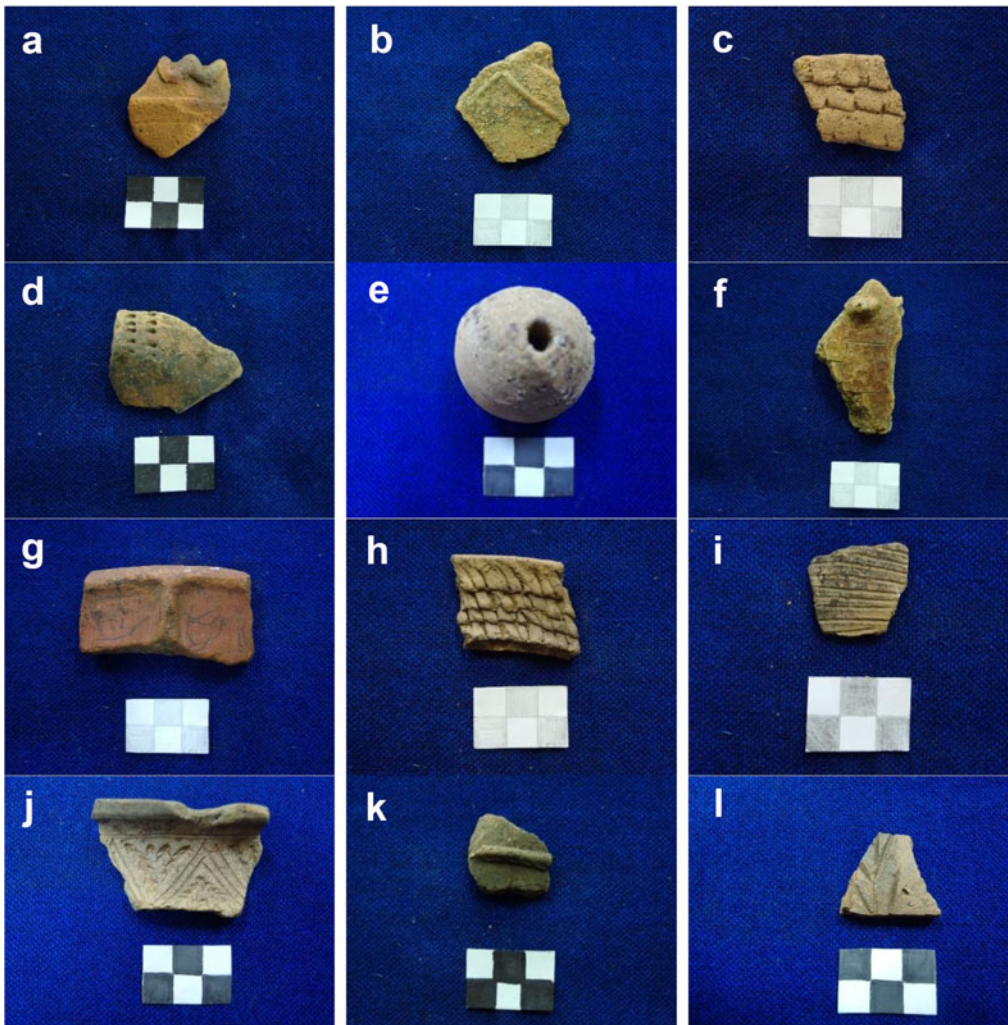


Figure 4. Ceramic pottery fragments and spindle whorl from Río Chico: (a) rim fragment with serpentine appliqué; (b) fragment with excised decoration; (c) fragment of the corrugated style; (d) fragment with punctated rows; (e) spindle whorl; (f) fragment with a button; (g) vessel rim with excised decoration; (h–i) fragments of the corrugated style; (j) rim fragment with incised palm-shaped designs with meander or flowers; (k) fragment with excised decoration; and (l) fragment with botanical motifs. (Color online)

We recovered two spindle whorls, likely used to spin cotton and possibly to make clothing, as well as some palm fiber for hammocks, knotted bags, and fishing nets. Of the 10 lithic artifacts found, one is a kind of ax or small hoe (Figure 6e), and another has an unknown function but presumably is a type of hammer (Figure 6g). The remainder are well-finished felling and clearing simple axes (Figures 6b, 6f, and 6h) or axes with spikes (Figures 6a and 6c) or with shrinkage (Figure 6d), with mostly smooth and shiny surfaces and with shapes suitable for hafting a stick as a handle. Because of the lack of an exact cultural context, absolute dates, or definitive previous studies on the subject, it was not possible to determine their precise cultural affiliation.

Biocultural Remains

At the INPC Laboratory in Quito, eight plant taxa were identified from starches in 11 ceramic vessel samples and one lithic tool sample (Figure 7; Table 2). They correspond to both cultivated and wild plants. Most must have been used as food, except the sarsaparilla (*Smilax* sp.), which is used



Figure 5. Small ceramic vessels in the secondary burial: (a) fine vessel with not determined period by style; (b) vessel with incisions and red-orange slip; and (c) Puruha style vessel. (Color online)

medicinally. Maize (*Zea mays*) was found in most of the samples and with greater frequency than the other taxa. Sweet potato (*Ipomoea batatas*), chili pepper (*Capsicum* sp.), and Indian shot (*Canna indica*) were found in two samples; beans (*Phaseolus* sp.), cassava (*Manihot esculenta*), sarsaparilla (*Smilax* sp.), and oca (*Oxalis tuberosa*) were each found in only one sample (Table 2).

Of the eight taxa, five (sweet potato, Indian shot, cassava, oca, and sarsaparilla) correspond to tubers or rhizomes, one (beans) to a leguminous plant, another to a cereal grain (maize), and another to a fruit (chili pepper). Four tubers, beans, and maize are potential sources of carbohydrates and were no doubt consumed as food. Because of its spicy flavor, chili pepper must have been used as a spice,



Figure 6. Lithic artifacts from Río Chico and vicinity: (a) ax with spikes; (b) simple ax; (c) ax with spikes; (d) ax with shrinkage; (e) simple ax with perforation or small hoe; (f) simple ax; (g) unknown artifact; and (h) simple ax. (Color online)

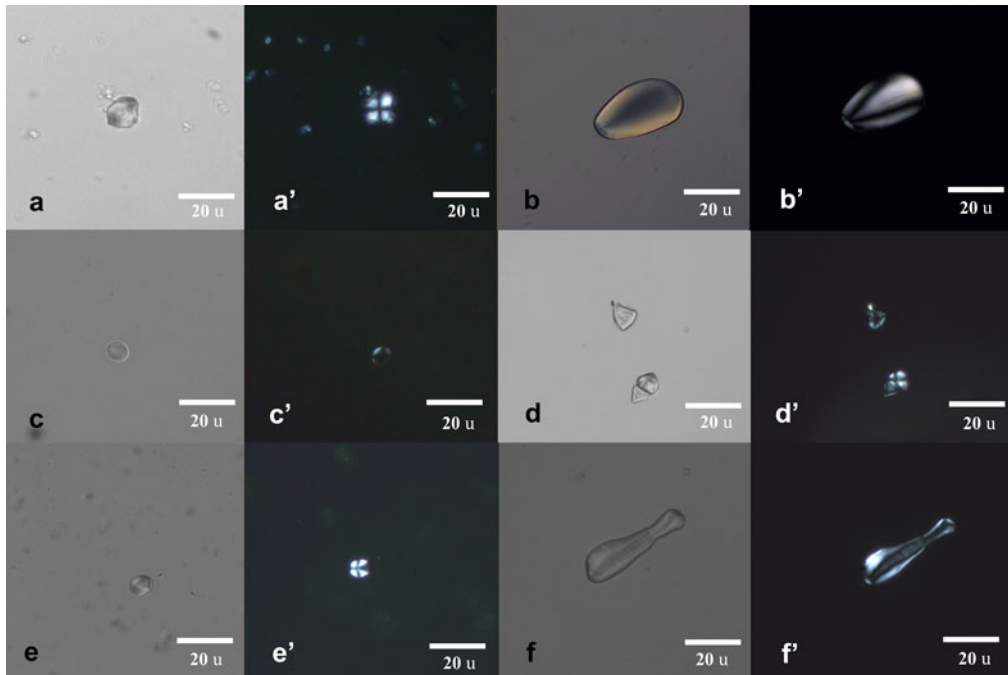


Figure 7. Identified starches (selection): (a) *Ipomoea batatas* (sweet potato); (b) *Canna indica* (Indian shot); (c) *Capsicum* sp. (chili pepper); (d) *Smilax* sp. (sarsaparilla); (e) *Manihot esculenta* (cassava); and (f) *Oxalis tuberosa* (oca). (Color online)

and the sarsaparilla was probably used for the preparation of medicines. Being an Andean crop, the presence of oca is surprising. This is the first time that chili pepper, sarsaparilla, sweet potato, Indian shot, and oca have been identified in an archaeological site in the Pastaza basin.

In the nearby Colina Moravia site, Pagán Jiménez and Rostain (2014) reported yam (*Dioscorea* sp.), ulluco (*Ullucus tuberosus*), cacao (*Theobroma* sp.), cassava, maize, beans, and other leguminous plants for the period around AD 0–1020. Río Chico and Colina Moravia have three taxa in common: cassava, beans, and maize (Figure 8), with maize being the most represented taxon at both sites and also found at Té Zulay. This recurrence of maize is significant, including its finding in a Regional Developmental vessel (Figure 5b) and in a pottery fragment (Figure 4d). This chronological placement is late considering that, a little farther south, sediment analyses in the bed of present-day Lake Ayauchi revealed pollen grains and maize phytoliths dating to the Formative period, up to 5300 BP (Bush et al. 1989; Piperno 1990). It is also worth recalling Roosevelt's (1980) thesis that the introduction of maize in the Orinoco basin around 800 BC (Parmana site) was important for population growth and the establishment of complex societies. However, due to the nonsystematic nature of the findings and the difficulty of associating them with clear ceramic typologies, it cannot be inferred that maize was *the* staple food and the trigger for population growth after the Regional Developmental period at Río Chico.

Finally, it is significant that plants like maize, chili pepper, Indian shot, beans, sweet potato, and oca were also identified farther north in the Tena River basin for the Integration period (INPC 2019). The first four plants were also found in the nearby Quijos Valley around 2,500 m asl for the same period (Cuéllar 2009). Farther south in the SALF site (1,100 m asl), identical plants—maize, chili pepper, manioc, beans, and sweet potato—were found beginning by about 5300–3460 BP. This is meaningful to the regional discussion about the origin, domestication, and dispersal of native Amazonian useful wild plants and crops, including manioc (more than 8000 BP) and chili pepper (more than 6000 BP) in the Andes Eastern foothills (Clement et al. 2010).

Table 2. Taxa per Sample.

Sample	Artifact Type	<i>Ipomoea batatas</i> (sweet potato)	<i>Phaseolus</i> sp. (bean)	<i>Canna indica</i> (Indian shot)	<i>Zea mays</i> (maize)	<i>Capsicum</i> sp. (chili pepper)	<i>Manihot esculenta</i> (manioc)	<i>Smilax</i> sp. (sarsaparilla)	<i>Oxalis tuberosa</i> (oca)
19-39-01	Pottery pot fragment	3	1	1					
19-39-02	Pottery pot fragment	2							
19-39-03	Pottery pot fragment				5	2	1		
19-39-04	Pottery pot fragment				2			2	
19-39-05	Pottery pot fragment				1	3			
19-39-06	Pottery pot fragment				2				
19-39-08	Pottery pot fragment			1	6				1
19-39-09	Lithic artifact				2				
19-39-10	Pottery pot fragment				6				
19-39-11	Pottery pot				3				
19-39-12	Pottery pot				2				
19-39-13	Pottery pot				2				
Total		5	1	2	31	5	1	2	1

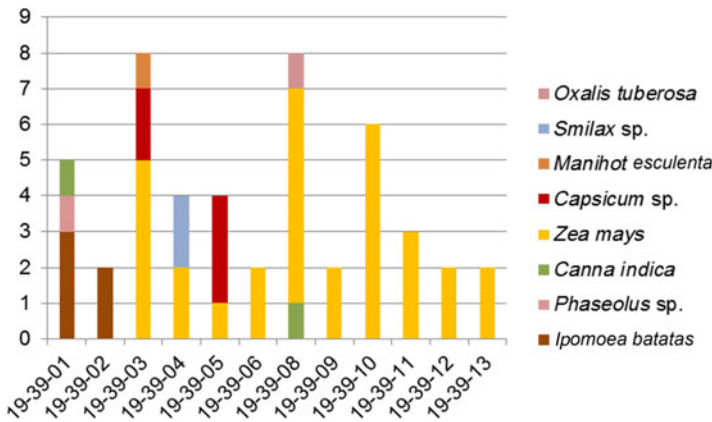


Figure 8. Occurrence of identified starches. (Color online)

Conclusions

Our preliminary results from Río Chico are important to our understanding of the Amazonian past for several reasons. Río Chico is a multicomponent site, having three distinguishable cultural periods. The recovery of an anthropomorphic vessel from the Puruha culture may be evidence of exchange or possibly kinship ties with the central Ecuadorian cordillera during the Regional Development and Integration periods, possibly indicating peer–polity interaction. Río Chico is thus far the only site in the Pastaza basin with remains of chili pepper, sarsaparilla, sweet potato, Indian shot, and oca, which indicates considerable plant biodiversity in the Regional Development and Integration periods. We also found evidence of other, more common crops in the diet of the cultures of the area, with maize being associated with social complexity and large populations. Río Chico is the oldest village-type mound site in the Pastaza River basin known so far, dating to around 2000 BC, which places it in the Formative period and, based on the site’s *tolas*, in the small group of monumental sites of the Upper Amazon. Being close to the Té Zulay complex, a larger archaeological site with later dates (beginning by 700 BC), we suggest that Río Chico may be the precursor to and the cultural origin of that complex.

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Data Availability Statement. The pottery fragments and lithic artifacts of the Río Chico site excavation are curated in the MEMPA in Puyo, Pastaza, Ecuador.

Competing Interests. The authors declare none.

References Cited

- Bush, Mark B., Dolores R. Piperno, and Paul A. Colinvaux. 1989. A 6,000-Year History of Amazonian Maize Cultivation. *Nature* 340:303–305.
- Clement, Charles R., Michelly de Cristo-Araújo, Geo Coppens d’Eeckenbrugge, Alessandro Alves Pereira, and Doriane Picanço-Rodrigues. 2010. Origin and Domestication of Native Amazonian Crops. *Diversity* 2:72–106.
- Cuéllar, Andrea M. 2009. *The Quijos Chiefdoms: Social Change and Agriculture in the Eastern Andes of Ecuador*. University of Pittsburgh Memoirs in Latin American Archaeology No. 20. Latin American Archaeology Publications, Pittsburgh, Pennsylvania.
- Delgado, Florencio, and Josefina Vásquez. 2016. Té Zulay, una aldea precolombina a orillas del Pastaza. *Huellas del Sumaco* 15(2):9–14.
- FAO/IIASA/ISRIC/ISSCAS/JRC. 2012. *Harmonized World Soil Database*. Version 1.21. <http://webarchive.iiasa.ac.at/Research/LUC/External-World-soil-database/HTML/index.html?sb=1>, accessed February 10, 2022.
- INPC. 2019. Análisis de paleoambiente y paleodieta del sitio arqueológico Pashimbi, provincia del Tena. En *Pashimbi Milenario: Informe del rescate y monitoreo arqueológico de las instalaciones de la Universidad Regional Amazónica Ikiam (capítulo VI)*, prepared by María Soledad Solórzano-Venegas. Report submitted to INPC, Quito.

- INPC. 2020. *Análisis de laboratorio: Temperaturas de cocción de cerámicas arqueológicas*. Río Chico. Report (INF-24-INPC-19) submitted to INPC, Quito.
- MAATE. 2013. *Sistema de clasificación de ecosistemas del Ecuador continental*. MAATE, Quito.
- Marcos, Jorge. 2003. A Reassessment of the Ecuadorian Formative. In *Archaeology of Formative Ecuador*, edited by J. Scott Raymond and Richard L. Burger, pp. 7–32. Dumbarton Oaks, Washington, DC.
- Meggers, Betty J. 1966. *Ecuador*. Praeger, New York.
- Murillo, Rocío. 2006. *Informe del reconocimiento arqueológico de las tolas de Té Zulay, parroquia Shell, cantón Mera*. INPC, Quito.
- Pagán Jiménez, Jaime R., and Stéphen Rostain. 2014. Uso de plantas económicas y rituales (medicinales o energizantes) en dos comunidades precolombinas de la Alta Amazonia ecuatoriana: Sangay (Huapula) y Colina Moravia (c. 400 a.C.-1200 d.C.). In *Antes de Orellana: Actas del 3er encuentro internacional de arqueología amazónica*, edited by Stéphen Rostain, pp. 313–322. FLACSO-Sede Ecuador, Quito.
- Pazmiño, Estanislao M. 2021. Monumentality and Social Complexity in the Upano Valley, Upper Amazon of Ecuador. In *The Archaeology of the Upper Amazon: Complexity and Interaction in the Andean Tropical Forest*, edited by Ryan Clasby and Jason Nesbitt, pp. 129–147. University Press of Florida, Gainesville.
- Piperno, Dolores R. 1990. Aboriginal Agriculture and Land Usage in the Amazon Basin, Ecuador. *Journal of Archaeological Science* 17:665–677.
- Porras, Pedro. 1987. *Investigaciones arqueológicas a las faldas del Sangay: Tradición Upano*. PUCE, Quito.
- Roosevelt, Anna C. 1980. *Parmana: Prehistoric Maize and Manioc Subsistence along the Amazon and Orinoco*. Academic Press, New York.
- Rostain, Stéphen. 1999. Secuencia arqueológica en montículos del valle del Upano en la Amazonía ecuatoriana. *Boletín del Instituto Francés de Estudios Andinos* 28(1):1–37.
- Rostain, Stéphen, Geoffroy de Saulieu, Carla Jaimes Betancourt, Jaime Pagán Jiménez, and Manuel Arroyo-Kalin. 2014. *Informe final del proyecto "Alto Pastaza, la entrada de la Amazonía entre sierra y selva."* INPC, Quito.
- Salazar, Ernesto. 2008. Pre-Columbian Mound Complexes in the Upano River Valley, Lowland Ecuador. In *Handbook of South American Archaeology*, edited by Helaine Silverman and William H. Isbell, pp. 263–278. Springer, New York.
- Valdez, Francisco. 2013. *Primeras sociedades de la Alta Amazonía: La cultura Mayo-Chinchi-Marañón*. INPC/IRD, Quito.
- Valdez, Francisco. 2021. The Mayo-Chinchi-Marañón Complex: The Unexpected Spirits of the Ceja. In *The Archaeology of the Upper Amazon: Complexity and Interaction in the Andean Tropical Forest*, edited by Ryan Clasby and Jason Nesbitt, pp. 62–82. University Press of Florida, Gainesville.
- Vásquez P., Josefina. 2010. *Informe de la prospección y delimitación arqueológica del Complejo Té Zulay, Provincia de Pastaza, Ecuador*. INPC, Quito.
- Winckell, Alain. 1997. Los grandes rasgos del relieve en el Ecuador. In *Paisajes naturales del Ecuador: Vol. 1, Las condiciones generales del medio natural*, edited by Alain Winckell, pp. 2–13. IPGH/IGM/IRD, Quito.
- Zarrillo, Sonia, Nilesh Gaikwad, Claire Lanaud, Terry Powis, Christopher Viot, Isabelle Lesur, Olivier Fouet, et al. 2018. The Use and Domestication of *Theobroma cacao* during the Mid-Holocene in the Upper Amazon. *Nature Ecology & Evolution* 2:1879–1888.