



**Smithsonian Tropical Research Institute**  
**Instituto Smithsonian de Investigaciones Tropicales**

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**First Amazon-Andean crop plant transfer and corn processing in Peru 3600-4000 years ago**

*Mouthwatering Peruvian cuisine like causa (mashed yellow potatoes layered with avocado and seafood) and carapulcra (dried potatoes and pork/chicken in peanut sauce) combine food crops from Amazon basin rainforests and Andean highlands. Smithsonian archaeologists and colleagues presenting in the prestigious journal, Nature<sup>1</sup>, uncover the first definitive evidence for this culinary, cultural link: 3600-4000 year-old plant microfossils and starch grains.*

Heading to the supermarket to pick up some corn flour, a couple of tomatoes or a can of beans usually doesn't conjure up the notion of 10,000 years of agricultural development in the Americas—a transition from hunter-gatherer cultures to agricultural cultures actively developing and trading new food crops. But this transition is still inadequately understood. New excavations and a growing collection of plant microfossil remains rapidly adds pieces to this puzzle.

A multidisciplinary team excavated a stone house at Waynuna, north of Arequipa on the western slope of the Andes and analyzed plant remains from three grinding stones.

**Arrowroot from the Amazon.** Starchy arrowroot (*Maranta* sp.) tubers don't grow in the Andean highlands. So the presence of tiny Arrowroot starch grains and phytoliths on the grinding stones and in associated sediments means that people were moving tubers from lowland Amazon rainforest sites east of the Andes west to the Waynuna site.

**Maize from Mexico.** Maize (*Zea mays*) cultivation also swept through the Americas in the millennia following its domestication from Teosinte, a wild ancestor from Mexico's tropical Balsas river valley, some 9000 years ago. At the Waynuna site, maize starch grains were the most common plant remains on the grinding stones. Phytoliths derived from the leaves of maize provided evidence that maize was grown at the site. The shape and grinding damage of maize particles suggests that two races of maize—one used as flour and another, popcorn or dent corn variety--were probably grown and processed at the site. The Waynuna house is older than any of the other sites in Peru where maize has been found and sets back the date of maize cultivation and processing in the region by ~1000 years.

**Obsidian trade.** The Waynuna site perches on the shoulders of Cerro Aycano, the northernmost point of one of the Andes' richest sources of obsidian. Ample archaeological evidence shows that preceramic peoples moved obsidian from the mountains down into the Amazon basin, so it is not surprising that travelers eventually introduced new foods to residents of this upland area.

Multiproxy microfossil analysis of starch grains and phytoliths is proving to be an extremely important tool—applied to stone tool surfaces and associated sediments, to new sites and to sites where warm, wet climates have destroyed larger plant remains. Future work is expected to yield a better understanding of the domestication and trade of peanuts, manioc and achira, staples depicted in the stone iconography of the first great cultures to develop in a region where amazing cooking is still the standard.

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The research team included members from the Smithsonian's National Museum of Natural History, the University of Maine, Orono, the Smithsonian Tropical Research Institute, along with Ithaca College in the U.S. and the Museo Contisuyo, Moquegua and the Instituto Nacional de Cultura, in Peru. This work was funded by a grant from the Heinz Charitable Trust Latin American Archaeology Program, FERCO, the Office of the Provost, Ithaca College, the Smithsonian Tropical Research Institute and the Smithsonian Museum of Natural History.

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Ref. Perry, L., Sandweiss, D., Piperno, D., Radmaker, K., Malpass, M., Umire, A. and de la Vera, P. 2006. Early maize agriculture and interzonal interaction in southern Peru. *Nature*, 2 March, 2006.

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