

Evidence from dirty teeth: Ancient Peruvians ate well

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Starch grains preserved on human teeth reveal that ancient Peruvians ate a variety of cultivated crops including squash, beans, peanuts and the fruit of cultivated pacay trees.

This finding by Dolores Piperno, staff scientist at the Smithsonian Tropical Research Institute and the National Museum of Natural History, and Tom Dillehay, professor of archaeology at Vanderbilt University, sets the date of the earliest human consumption of beans and pacay back by more than 2,000 years and indicates that New World people were committed farmers earlier than previously thought.

In northern Peru's Ñanchoc Valley, Dillehay and colleagues recovered human teeth from hearths and floors of permanent, roundhouse structures. Human bone, plant remains and charcoal closely associated with the teeth are approximately 6,000 to 8,000 years old according to carbon- dating techniques.

Piperno examined 39 human teeth, probably from six to eight individuals. "Some teeth were dirtier than others. We found starch grains on most of the teeth. About a third of the teeth contained large numbers of starch grains," Piperno said.

To identify the starch grains, Piperno compared the particles in tooth scrapings with her modern reference collection of starch grains from more than 500 economically important plants. "We found starch from a variety of cultivated plants: squash, Phaseolus beans—either limas or

common beans, possibly, but not certainly the former, pacay and peanuts,” said Piperno. “Parts of plants that often are not evident in archeological remains, such as the flesh of squash fruits and the nuts of peanuts, do produce identifiable starch grains.”

Starch from squash found on the teeth affirms that early people were eating the plants and not simply using them for nonfood purposes, such as for making containers or net floats. Whether or not some of the earliest cultivated plants, such as squashes, were grown as dietary items has been a long-debated question among students of early agriculture.

Evidence that foods had been cooked was also visible on some of the starch grains. “We boiled beans in the lab to see what cooked starch grains looked like—and recognized these gelatinized or heat-damaged grains in the samples from the teeth,” said Piperno. Starch from raw and roasted peanuts looks similar, probably because it is protected within the hull.

Starch grains from four of the crops were found consistently through time indicating that beans, peanuts, squash and pacay were important food sources then, as they are today. “Starch analysis of teeth, which, unlike other archaeobotanical techniques, provides direct evidence of plant consumption, should greatly improve our ability to address other important questions in human dietary change relating to even earlier time periods,” said Piperno.

The results of this study appear online in *Proceedings of the National Academy of Sciences*, the week of Dec. 1-5, 2008.

Provided by Smithsonian Tropical Research Institute

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