Study shows Maya intensively cultivated manioc 1,400 years ago

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CU-Boulder anthropology Professor Payson Sheets and his team uncovered a manioc field one-third the size of football field buried under 10 feet of ash by the eruption of a volcano about 1,400 years ago that blanketed the Mayan farming village of Ceren in El Salvador. Credit: Image courtesy University of Colorado

A University of Colorado at Boulder team has uncovered an ancient and previously unknown Maya agricultural system -- a large manioc field intensively cultivated as a staple crop that was buried and exquisitely preserved under a blanket of ash by a volcanic eruption in present-day El Salvador 1,400 years ago.

Evidence shows the manioc field -- at least one-third the size of a football field -- was harvested just days before the eruption of the Loma Caldera volcano near San Salvador in roughly A.D. 600, said CU-Boulder anthropology Professor Payson Sheets, who is directing

excavations at the ancient village of Ceren. The cultivated field of manioc was discovered adjacent to Ceren, which was buried under 17 feet of ash and is considered the best preserved ancient farming village in all of Latin America.

The ancient planting beds of the carbohydrate-rich tuber are the first and only evidence of an intensive manioc cultivation system at any New World archaeology site, said Sheets. While two isolated portions of the manioc field were discovered in 2007 following radar work and limited excavation, 18 large test pits dug in spring 2009 -- each measuring about 10 feet by 10 feet -- allowed the archaeologists to estimate the size of the field and assess the related agricultural activity that went on there.

Sheets said manioc pollen has been found at archaeological sites in Belize, Mexico and Panama, but it is not known whether it was cultivated as a major crop or was just remnants of a few garden plants. "This is the first time we have been able to see how ancient Maya grew and harvested manioc," said Sheets, who discovered Ceren in 1978.

Ash hollows in the manioc planting beds at Ceren left by decomposed plant material were cast in dental plaster by the team to preserve their shape and size, said Sheets. Evidence showed the field was harvested and then replanted with manioc stalk cuttings just a few days before the eruption of the volcano.

A few anthropologists have suspected that manioc tubers -- which can be more than three feet long and as thick as a man's arm -- were a dietary salvation for ancient, indigenous societies living in large cities in tropical Latin America. Corn, beans and squash have long been known to be staples of the ancient Maya, but they are sensitive to drought and require fertile soils, said Sheets.

"As 'high anxiety' crops, they received a lot of attention, including major

roles in religious and cosmological activities of the Maya," said Sheets. "But manioc, which grows well in poor soils and is highly drought resistant did not. I like to think of manioc like an old Chevy gathering dust in the garage that doesn't get much attention, but it starts right up every time when the need arises."

Calculations by Sheets indicate the Ceren planting fields would have produced roughly 10 metric tons of manioc annually for the 100 to 200 villagers believed to have lived there. "The question now is what these people in the village were doing with all that manioc that was harvested all at once," he said. "Even if they were gorging themselves, they could not have consumed that much."

The CU-Boulder team also found the shapes and sizes of individual manioc planting ridges and walkways varied widely. "This indicates the individual farmers at Ceren had control over their families' fields and cultivated them they way they wanted, without an external higher authority telling them what to do and how to do it," he said.

The team also found that the manioc fields and adjacent cornfields at Ceren were oriented 30 degrees east of magnetic north -- the same orientation as the village buildings and the public town center, said Sheets. "The villagers laid out the agricultural fields and the town structures with the same orientation as the nearby river, showing the importance and reverence the Maya had for water," he said.

The volcano at Ceren shrouded adobe structures, thatched roofs, house beams, woven baskets, sleeping mats, garden tools and grain caches. The height of the corn stalks and other evidence indicate the eruption occurred early on an August evening, he said.

Because it is unlikely that the people of Ceren were alone in their intensive cultivation of manioc, Sheets and his colleagues are now

investigating chemical and microscopic botanical evidence at other Maya archaeological sites that may be indicators of manioc cultivation and processing.

Sheets said Maya villagers living in the region today have a long tradition of cutting manioc roots into small chunks, drying them eight days, then grinding the chunks into a fine, flour-like powder known as almidón. Almidón can be stored almost indefinitely, and traditionally was used by indigenous people in the region for making tamales and tortillas and as a thickening agent for stews, he said.

Since indigenous peoples in tropical South America use manioc today to brew alcoholic beverages, including beer, the CU-Boulder team will be testing ceramic vessels recovered from various structures at Ceren for traces of manioc. To date, 12 structures have been excavated, and others detected by ground-penetrating radar remain buried, he said.

Sheets is particularly interested in vessels from a religious building at Ceren excavated in 1991. The structure contained such items as a deer headdress painted red, blue and white; a large, alligator-shaped painted pot; the bones of butchered deer; and evidence that large quantities of food items like meat, corn, beans and squash were prepared on-site and dispensed to villagers from the structure, said Sheets.

Ceren's residents apparently were participating in a spiritual ceremony in the building when the volcano erupted, and did not return to their adobe homes, which excavations showed were void of people and tied shut from the outside. "I think there may have been an emergency evacuation from the ceremonial building when the volcano erupted," he said. To date, no human remains have been found at Ceren.

Source: University of Colorado at Boulder (news : web)