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Smithsonian Scientists Report Ancient Chili Pepper History; Americans Cultivated and Traded Chili Peppers 6,000 Years Ago

Smithsonian researchers and colleagues report that across the Americas, chili peppers (*Capsicum* species) were cultivated and traded as early as 6,000 years ago—predating the invention of pottery in some areas of the Americas. The researchers analyzed starch grains to trace the history of chili peppers in the Americas. Their findings contribute significantly to the current understanding of ancient agricultural practices in the Americas. The report is published in the Feb. 16 issue of the journal *Science*.

When Europeans arrived in the Americas, chili peppers were among the most widespread of the plants domesticated in the New World. However, the chronology and precise geography of their origins and early dispersals had been very poorly understood. Tropical environments, where many chili varieties were first domesticated and then incorporated into prehistoric farming systems, degrade most organic archaeological remains, washing away and decomposing all but the most durable evidence of ancient human activities. Lead author Linda Perry, of the Smithsonian's National Museum of Natural History, and colleagues overcame this obstacle by identifying chili pepper starch grains. The starch microfossils were found at seven sites dating from 6,000 years ago to European contact and ranging from the Bahamas to southern Peru.

The Smithsonian holds the most extensive reference collection of microscopic plant remains available to archaeologists—starch, pollen grains and microfossils called phytoliths. The team of researchers adding to this collection discovered that starch grains from chili peppers, members of the genus *Capsicum*, are shaped like red blood cells, with a strong, central line or split on the side.

“Sorting through microscopic particles and finding a type that distinguishes such an important plant group is like opening a window to the past,” Perry said. “While we once based our understanding of chili peppers on rare sites with exceptionally good preservation, suddenly we are able to gain incredible insight into ancient agriculture, trade and cuisine by making these plants visible nearly everywhere they occurred.”

Cultivated chili starch grains are discernible from those of wild chilies. The remains of these domesticated chili peppers were often found with corn, forming part of a major, ancient food complex that predates pottery in some regions.

The oldest *Capsicum* starch grains were found in southwestern Ecuador at two sites dating to 6,100 years ago. The chili remains were associated with previously identified corn, achira, arrowroot, leren, yuca, squash, beans and palm fruit, adding to the picture of an early, complex agricultural system in that region. Ecuador is not considered to be the center of domestication for any of the five domesticated chili species. A more ancient record of the domestication and spread of chili peppers awaits investigators working in other regions where wild chilies were first brought into cultivation.

In Panama, chilies occurred with corn and domesticated yams that dated 5,600 years before present (ybp). Chilies were found at a site occupied 4,000 ybp in the Peruvian Andes, with microscopic remains of corn, arrowroot and possibly potato. In this case, the chilies were identified as the species *C. pubescens*. The rocoto pepper, a cultivar of this species, is still a staple in the Peruvian diet. Newer sites in the Bahamas (1,000 ybp) and in Venezuela (500-1,000 ybp) also yielded remains of both corn and chilies.

“It’s hard to imagine modern Latin American cuisine without chili peppers,” said co-author Dolores Piperno, Smithsonian scientist at the National Museum of Natural History and at the Smithsonian Tropical Research Institute in Panama. “We demonstrate that prehistoric people from the Bahamas to Peru were using chilies in a variety of foods a long time ago. The peppers would have enhanced the flavor of early cultivars such as maize and manioc and may have contributed to their rapid spread after they were domesticated.”

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The Smithsonian’s National Museum of Natural History in Washington, D.C., is the most visited natural history museum in the world. Opened in 1910, the museum is dedicated to maintaining and preserving the world’s most extensive collection of natural history specimens and human artifacts. It also fosters critical scientific research as well as educational programs and exhibitions that present the work of its scientists and curators to the public.

The Smithsonian Tropical Research Institute, headquartered in Panama City, Panama, furthers the understanding of tropical nature and its importance to human welfare; trains students to conduct research in the tropics; and promotes conservation by increasing public awareness of the beauty and importance of tropical ecosystems.

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