Oldest evidence of marijuana use discovered in 2500-year-old cemetery in peaks of western China

By **Andrew Lawler**Jun. 12, 2019 , 2:00 PM

Today, more than 150 million people regularly smoke cannabis, making it one of the world's most popular recreational drugs. But when and where humans began to appreciate the psychoactive properties of weed has been more a matter of speculation than science. Now, a team led by archaeologists Yang Yimin and Ren Meng of the Chinese Academy of Sciences in Beijing reports clear physical evidence that mourners burned cannabis for its intoxicating fumes on a remote mountain plateau in Central Asia some 2500 years ago.

The study, published today in *Science Advances*, relies on new techniques that enable researchers to **identify the chemical signature of the plant** and even evaluate its potency. "We are in the midst of a really exciting period," says team member Nicole Boivin of the Max Planck Institute for the Science of Human History (MPI-SHH) in Jena, Germany. The paper is part of a wider effort to track how the drug spread along the nascent Silk Road, on its way to becoming the global intoxicant it is today.

Cannabis, also known as hemp or marijuana, evolved about 28 million years ago on the eastern Tibetan Plateau, according to a pollen study published in May. A close relative of the common hop found in beer, the plant still grows wild across Central Asia. More than 4000 years ago, Chinese farmers began to grow it for oil and for fiber to make rope, clothing, and paper.

Pinpointing when people began to take advantage of hemp's psychoactive properties has proved tricky. Archaeologists had made claims of ritual cannabis burning in Central Asian sites as far back as 5000 years ago. But new analyses of those plant remains by other teams suggest that early cannabis strains had low levels of tetrahydrocannabinol (THC), the plant's most powerful psychoactive component, and so lacked mind-altering properties. One academic who works in Central Asia said he and colleagues tried to smoke and eat wild varieties—but got no buzz.

Ancient people put cannabis leaves and hot stones in this brazier, and likely inhaled the resulting smoke.

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The cannabis burned 2500 years ago at the Jirzankal cemetery, 3000 meters high in the Pamir Mountains in far western China, was different. Excavations there have uncovered skeletons and wooden plates, bowls, and Chinese harps, as well as wooden braziers that held burning material. All are typical of the Sogdians, a people of western China and Tajikistan who generally followed the Persian faith of

Zoroastrianism, which later celebrated the mind-expanding properties of cannabis in sacred texts. At Jirzankal, glass beads typical of Western Asia and silk from China confirm the long-distance trade for which the Sogdians became famous, and isotopic analysis of 34 skeletons showed that nearly a third were migrants. Radiocarbon analysis put the burials at about 500 B.C.E.

The wooden braziers were concentrated in the more elite tombs. Yang's and Ren's team ground bits of brazier into powder and applied gas chromatography and mass spectrometry to identify chemical compounds left behind. They found unusually high levels of THC compared with typical wild cannabis, although much less than in today's highly bred plants. The cannabis was apparently burned in an enclosed space, so mourners almost certainly inhaled THC-laced fumes, the authors say, making this the earliest solid evidence of cannabis use for psychoactive purposes.

Archaeologists have spotted signs of ancient cannabis use from western China to the Caucasus.

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The region's high altitude could have stressed the cannabis, creating plants naturally high in THC, says co-author Robert Spengler, also of MPI-SHH. "It is quite likely that people came across cannabis plants at higher elevations that were naturally producing higher THC levels," he says. But humans may also have intervened to breed a more wicked weed, he adds.

"The methods are convincing, and the data are unambiguous regarding early use of cannabis as a psychoactive substance," says Tengwen Long, an environmental scientist at the University of Nottingham in the United Kingdom who has researched cannabis origins. But Megan Cifarelli, an art historian at Manhattanville College in Purchase, New York, who has studied ancient drug use, notes the aromatic fumes might also have had another purpose: to mask the smell of a putrefying corpse.

Yang's and Ren's team thinks cannabis use was restricted to elites until potent pot began to spread across Central Asia through the Silk Road linking China with Iran. In 440 B.C.E., the Greek historian Herodotus wrote that the nomadic Scythians, who controlled vast areas from Siberia to Eastern Europe, made tents and heated rocks in order to inhale hemp vapors that made them "shout for joy." And Andrei Belinski, an archaeologist based at the heritage museum in Stavropol, Russia, in 2013 began to excavate a nearby 2400-year-old Scythian tomb that held gold vessels bearing residues of both opium and cannabis, supporting the idea that elites used the drug first.

Ancient artwork and textual references from Syria to China **hint at even earlier cannabis drug use**, and the new analytical methods could soon provide concrete evidence of this, says Michael Frachetti, an archaeologist at Washington University in St. Louis, Missouri. But it's already clear that the ancient Silk Road trafficked in more than spices, grains, and ideas. "Crops weren't just about food," he says. "They were also about making contact with another world."

Andrew Lawler

Contributing Correspondent Andrew Lawler is based in Asheville, North Carolina. His most recent book is *The Secret Token: Myth, Obsession, and the Search for the Lost Colony of Roanoke.*