



Press Release

Embargoed until July 4, 8pm (MEZ)

Farming Started in Several Places at Once

Researchers from Tübingen document origins of agriculture in the Zagros foothills of Iran

Tübingen, 7/4/2013

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For decades archaeologists have been searching for the origins of agriculture. Their findings indicated that early plant domestication took place in the western and northern Fertile Crescent. In the July 5 edition of the journal *Science*, researchers from the University of Tübingen, the Tübingen Senckenberg Center for Human Evolution and Paleoenvironment, and the Iranian Center for Archaeological Research demonstrate that the foothills of the Zagros Mountains of Iran in the eastern Fertile Crescent also served as a key center for early domestication.

Archaeologists Nicholas Conard and Mohsen Zeidi from Tübingen led excavations at the aceramic tell site of Chogha Golan in 2009 and 2010. They documented an 8 meter thick sequence of exclusively aceramic Neolithic deposits dating from 11,700 to 9,800 years ago. These excavations produced a wealth of architectural remains, stone tools, depictions of humans and animals, bone tools, animal bones, and – perhaps most importantly – the richest deposits of charred plant remains ever recovered from the Pre-Pottery Neolithic of the Near East.

Simone Riehl, head of the archaeobotany laboratory in Tübingen, analyzed over 30,000 plant remains of 75 taxa from Chogha Golan, spanning a period of more than 2,000 years. Her results show that the origins of agriculture in the Near East can be attributed to multiple centers rather than a single core area and that the eastern Fertile Crescent played a key role in the process of domestication.

Many pre-pottery Neolithic sites preserve comparatively short sequences of occupation, making the long sequence from Chogha Golan particularly valuable for reconstructing the development of new patterns of human subsistence. The most numerous species from Chogha Golan are wild barley, goat-grass and lentil, which are all wild ancestors of modern

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crops. These and many other species are present in large numbers starting in the lowest deposits, horizon XI, dating to the end of the last Ice Age roughly 11,700 years ago. In horizon II dating to 9.800 years ago, domesticated emmer wheat appears.

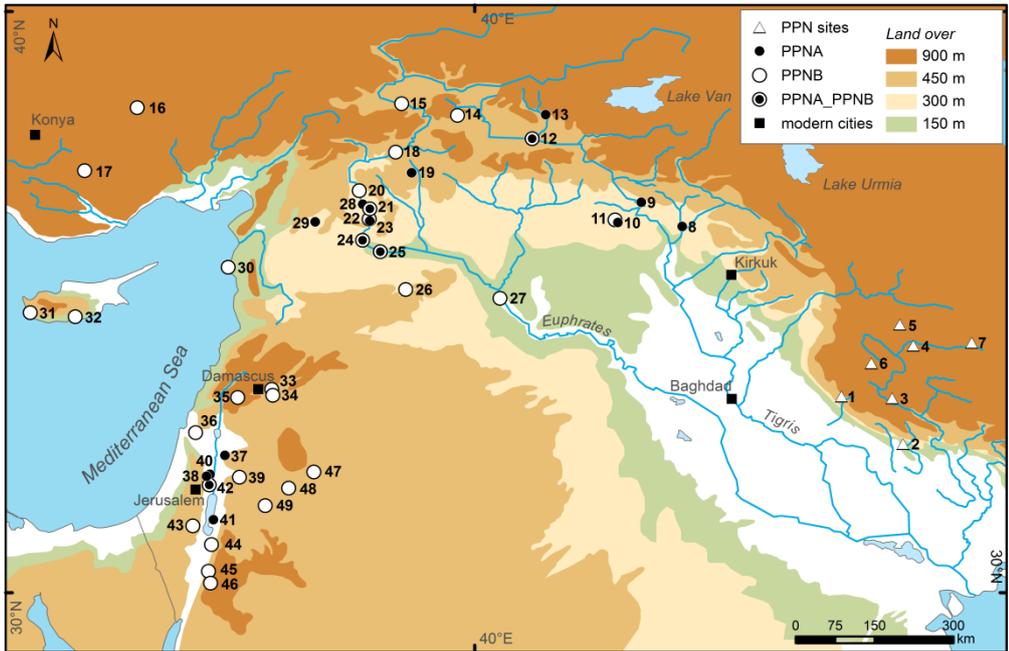
The plant remains from Chogha Golan represent a unique, long-term record of cultivation of wild plant species in the eastern Fertile Crescent. Over a period of two millennia the economy of the site shifted toward the domesticated species that formed the economic basis for the rise of village life and subsequent civilizations in the Near East. Plants including multiple forms of wheat, barley and lentils together with domestic animals later accompanied farmers as they spread across western Eurasia, gradually replacing the indigenous hunter-gather societies. Many of the plants that were domesticated in the Fertile Crescent form the economic basis for the world population today.

Original Publication: "Local emergence of agriculture in the foothills of the Zagros Mountains of Iran", *Science*, July 5 2013, doi: 10.1126/science.1236743

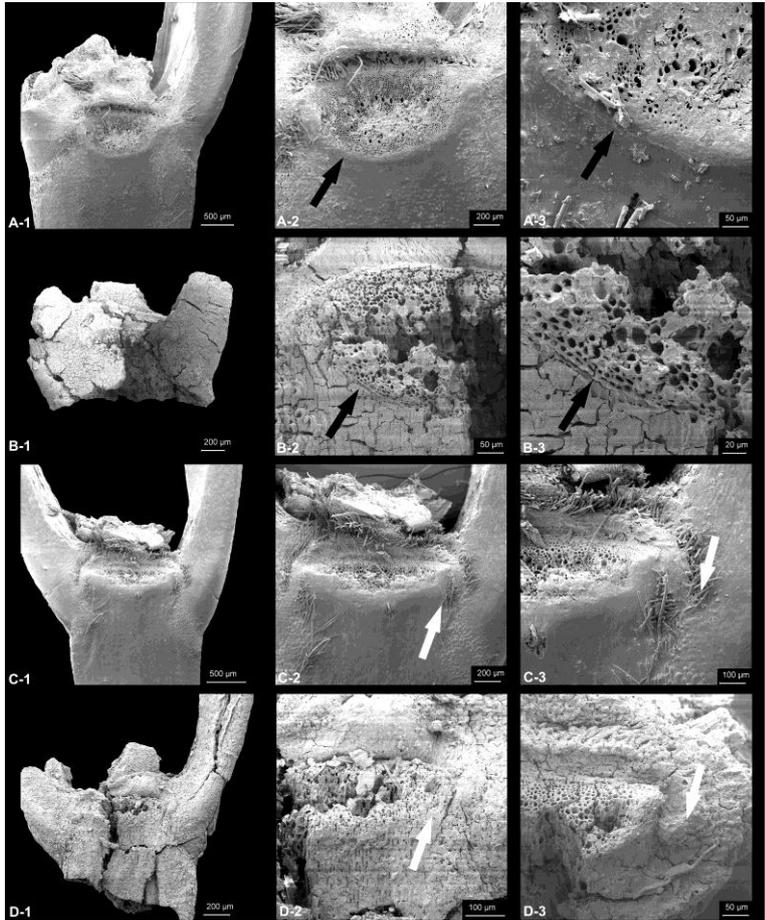
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Excavations in the Fertile Crescent: Tübingen archaeologists found evidence of early agriculture at Chogha Golan (1) Image: Simone Riehl



Archeobotanical specimens of wild (B) and domesticated emmer (D), compared with modern seeds (A and C). Photos: Simone Riehl



An animal figurine from Chogha Golan. Image: Mohsen Zeidi



Tübingen archaeologists at work atop the tell and 8m below the surface. Photos: Nicholas Conard/Saman Hamzavi



Further pictures available at: <http://www.eurekalert.org/pio/sci/>

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Our core research areas include: integrative neuroscience, clinical imaging, translational immunology and cancer research, microbiology and infection research, biochemistry and pharmaceuticals research, the molecular biology of plants, geo-environment research, astro- and elementary particle physics, quantum physics and nanotechnology, archeology and prehistory, history, religion and culture, language and cognition, media and education research.

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