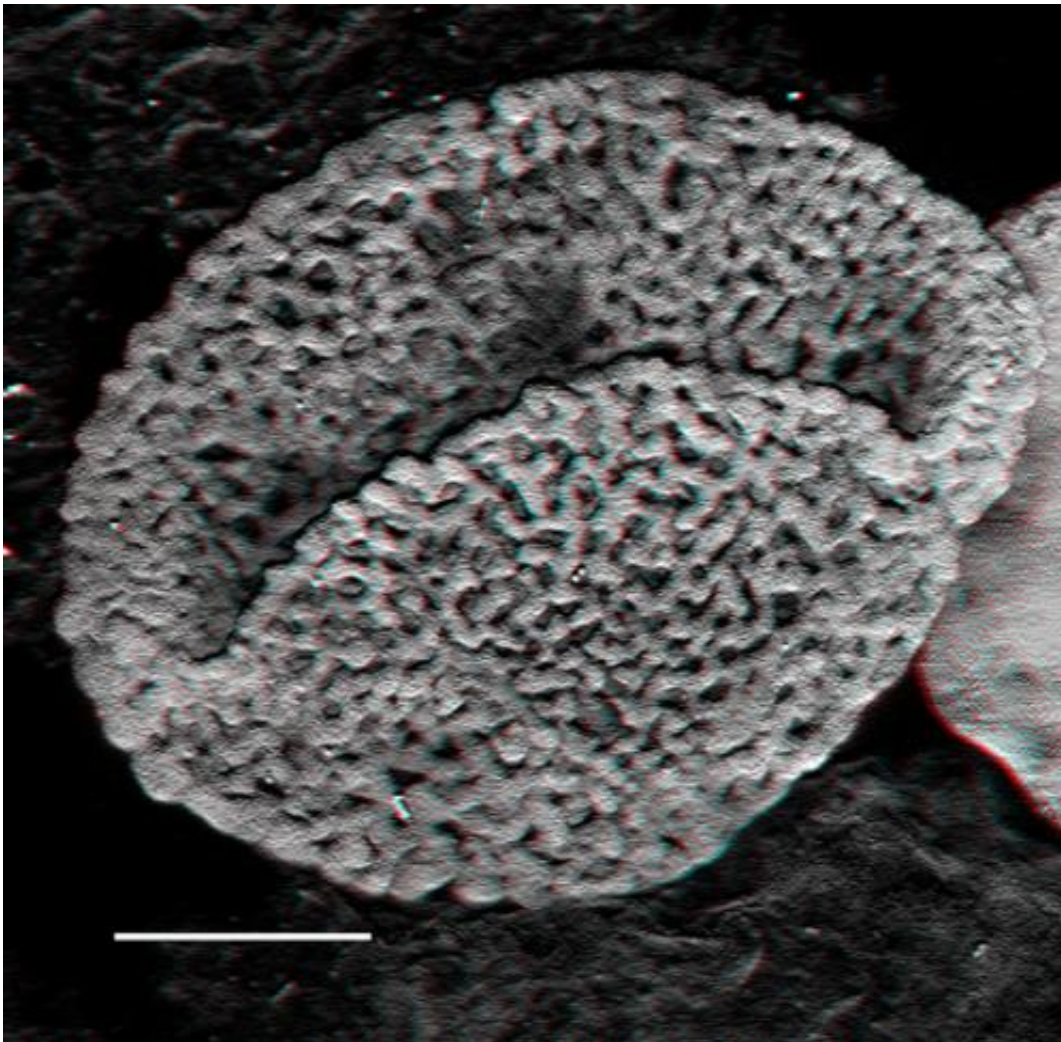


New fossils push the origin of flowering plants back by 100 million years to the early Triassic

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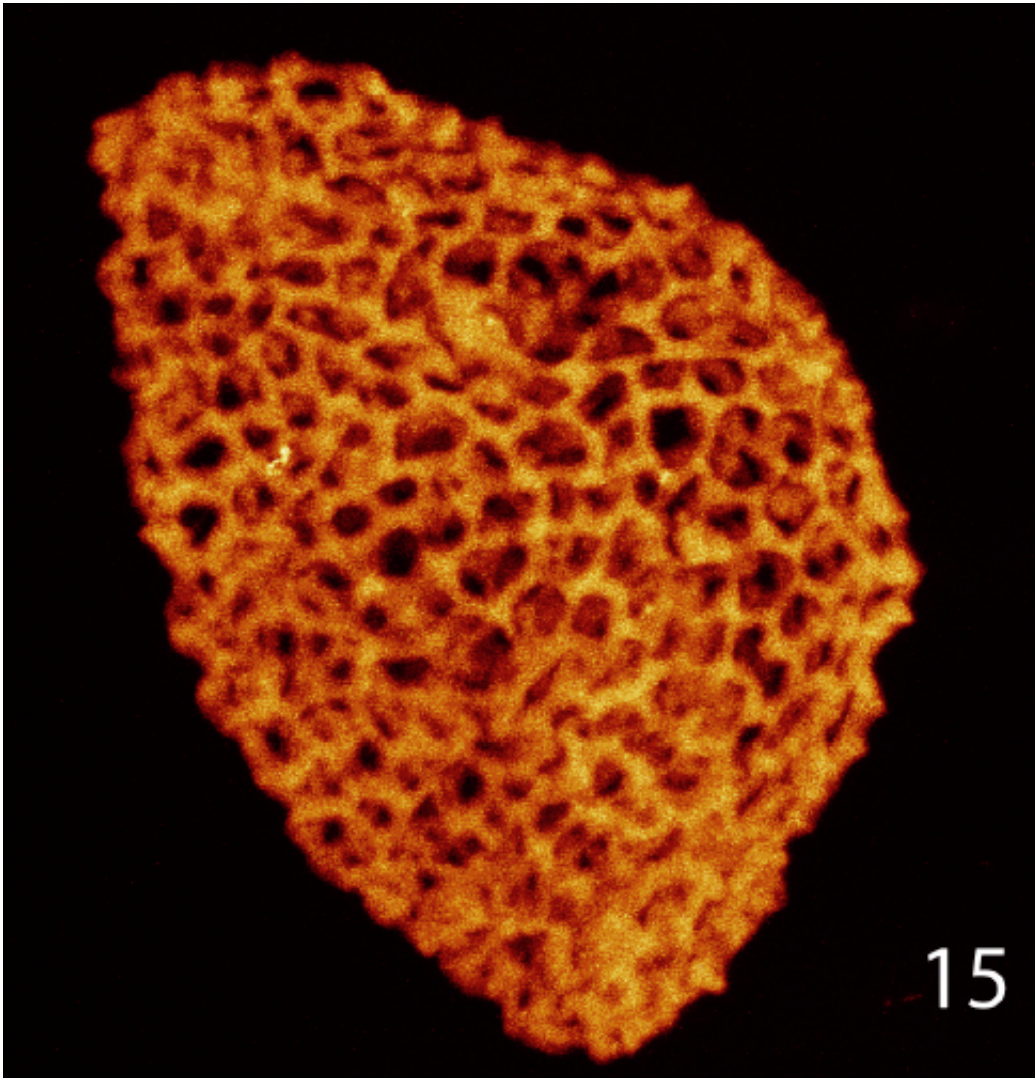
This image shows flower-like pollen from the Triassic. Credit: UZH

Drilling cores from Switzerland have revealed the oldest known fossils of direct ancestors of flowering plants. These beautifully preserved 240-million-year-old pollen grains are evidence that flowering plants evolved 100 million years earlier than previously thought, according to researchers from the University of Zurich.

Flowering plants evolved from extinct plants related to conifers, ginkgos, cycads, and seed ferns. The oldest known fossils from flowering plants are [pollen](#) grains. These are small, robust and numerous and therefore fossilize more easily than leaves and flowers.

An uninterrupted sequence of fossilized pollen from flowers begins in the Early Cretaceous, approximately 140 million years ago, and it is generally assumed that flowering plants first evolved around that time. But the present study documents flowering plant-like pollen that is 100 million years older, implying that flowering plants may have originated in the Early Triassic (between 252 to 247 million years ago) or even earlier.

Many studies have tried to estimate the age of flowering plants from molecular data, but so far no consensus has been reached. Depending on dataset and method, these estimates range from the Triassic to the Cretaceous. Molecular estimates typically need to be "anchored" in fossil evidence, but extremely old fossils were not available for flowering plants. "That is why the present finding of flower-like pollen from the Triassic is significant", says Prof. Peter Hochuli, University of Zurich.



This is an image of pollen. Credit: Peter A. Hochuli¹, P, A and Feist-Burkhardt. S, *Frontiers in Plant Science*, 2013.

Peter Hochuli and Susanne Feist-Burkhardt from Paleontological Institute and Museum, University of Zürich, studied two drilling cores from Weiach and Leuggern, northern Switzerland, and found pollen grains that resemble fossil pollen from the earliest known flowering plants. With Confocal Laser Scanning Microscopy, they obtained high-resolution images across three dimensions of six different types of pollen.

In a previous study from 2004, Hochuli and Feist-Burkhardt documented different, but clearly related flowering-plant-like pollen from the Middle Triassic in cores from the Barents Sea, south of Spitsbergen. The samples from the present study were found 3000 km south of the previous site. "We believe that even highly cautious scientists will now be convinced that flowering plants evolved long before the Cretaceous", say Hochuli.

What might these primitive [flowering plants](#) have looked like? In the Middle Triassic, both the Barents Sea and Switzerland lay in the subtropics, but the area of Switzerland was much drier than the region of the Barents Sea. This implies that these plants occurred a broad ecological range. The pollen's structure suggests that the [plants](#) were pollinated by insects: most likely beetles, as bees would not evolve for another 100 million years.

More information: Peter A. Hochuli and Susanne Feist-Burkhardt. Angiosperm-like pollen and Afropollis from the Middle Triassic (Anisian) of the Germanic Basin (Northern Switzerland). *Frontiers in Plant Science*. [DOI: 10.3389/fpls.2013.00344](https://doi.org/10.3389/fpls.2013.00344)

Provided by University of Zurich

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