

Science News

from research organizations

Two new genera and species of conifers discovered from upper Cretaceous in Hokkaido, Japan

Date: August 3, 2021

Source: Perot Museum of Nature and Science

Summary: Paleobotanists describe two new genera of ancient conifers based on two beautifully preserved 3-D fossil seed cones. These new conifers belong to the cypress family, which was important in many ecosystems during the age of dinosaurs.

Share: [!\[\]\(17413706fd4997a1a4bdf85c6864eee1_img.jpg\)](#) [!\[\]\(f419710cbe076aa30a9c6c031b5cbe84_img.jpg\)](#) [!\[\]\(2726020a4107bdc9042b257034f90eb3_img.jpg\)](#) [!\[\]\(9459655bf14a84f4d775e8d814cca8c9_img.jpg\)](#) [!\[\]\(de47dbdca34225b222a4a87ac0e499b3_img.jpg\)](#)

FULL STORY

Illustrations depicting the dinosaur era -- whether in books or movies -- are often accompanied by lush greenery. And during the Cretaceous period, the trees commonly dominating a wide range of Earth's terrestrial environments were conifers -- similar to the pines, spruces cypresses and cedars that populate the earth today. These conifers played a key role in ecosystems, providing nourishment, nutrients, and habitat for a range of prehistoric creatures.

In a recently published paper, a team of American paleobotanists describe two new genera of ancient conifers based on two beautifully preserved 3-D fossil seed cones. The scientific paper describing the find -- titled "Ancient diversity and turnover of cunninghamioid conifers (Cupressaceae): two new genera from the Upper Cretaceous of Hokkaido, Japan" -- has been published online in the scientific journal, *Botany*. Co-authors of the report are Brian A. Atkinson, Ph.D., assistant professor at University of Kansas and curator of paleobotany at the Biodiversity Institute, Lawrence, Kan.; Dori L. Contreras, Ph.D., curator of paleobotany, Perot Museum of Nature and Science, Dallas, Texas; Ruth A. Stockey, Ph.D., professor, Oregon State University, Corvallis, Ore.; and Gar W. Rothwell, Ph.D., distinguished professor emeritus, Ohio University, Athens, Ohio.

The fossils are named *Ohanastrobus hokkaidoensis* and *Nishidastrobus japonicum* in honor of Tamiko Ohana (National Museum of Nature and Science, Tsukuba, Japan) and Professor Harufumi Nishida (Chuo University, Hachioji, Japan) for their contributions to paleobotany.

These cones belong to the Cupressaceae (cypress) family, which was widespread and important in many ecosystems during the age of dinosaurs. This is especially true for one of the oldest lineages of family -- the cunninghamioids. The two new genera show that cunninghamioids had very diverse forms and were particularly important components of Cretaceous ecosystems of eastern Asia.

"What's interesting about these two new genera, specifically, is that they represent part of the last heyday of cunninghamioids before the group's diversity declined toward the end of the Cretaceous," said Contreras. "Today we are left with only one living genus, *Cunninghamia*, which are large evergreen trees that grow in the forests of China, Taiwan, Vietnam, and Laos."

The two new cones showed combinations of unique features that indicated they were different from each other and all previously known species, therefore they have been named as two new genera. Differences include their more cylindrical shape compared to the modern *Cunninghamia* and most other extinct genera, the number and form of their cone scales, and many aspects of their internal anatomy.

How the discoveries were unearthed and analyzed

The cones come from the Cretaceous of Japan and are permineralizations, a type of fossil which preserves all the details of the cells that make up the cones. To study them, the team of paleobotanists used a method called the cellulose acetate peel technique. The fossils are originally cut with a rock saw in two halves vertically to get a "longitudinal section" and then cut perpendicular to that to get a "cross section" (see image).

The cut surfaces are polished and then etched with an acid. A sheet of acetate film is placed on the surface with acetone, which adheres to the fossil surface. The film is then removed, leaving a microscopically thin peel of the fossil specimen attached to the film. The process is repeated so that the successive peel slices can be studied under microscopes to understand the three-dimensional anatomy of the specimens and describe them in detail.

As part of their findings, the research team analyzed and compiled the records of all cunninghamioid and similar conifers to understand how their diversity has changed through time. They show that during the Jurassic to Cretaceous there was a much greater diversity of this important group of conifers, both by the number of different genera (at least 12 fossil genera compared to only one living genus!) and species, and by the variation in the form of their cones. The living genus *Cunninghamia* appears during the Campanian and maintains a nearly continuous fossil record through to today, while nearly all other extinct genera of cunninghamioid Cupressaceae disappear by the close of the Campanian (~72 million years ago).

The two new species expand the known diversity of the cunninghamioids before their decline toward the end of the Cretaceous and further demonstrate the importance of these conifers in Cretaceous ecosystems, particularly in eastern Asia.

Story Source:

Materials provided by **Perot Museum of Nature and Science**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Brian A. Atkinson, Dori L. Contreras, Ruth A. Stockey, Gar W. Rothwell. **Ancient diversity and turnover of cunninghamioid conifers (Cupressaceae): two new genera from the Upper Cretaceous of Hokkaido, Japan**. *Botany*, 2021; 99 (8): 457 DOI: 10.1139/cjb-2021-0005

Cite This Page:

MLA	APA	Chicago
-----	-----	---------

Perot Museum of Nature and Science. "Two new genera and species of conifers discovered from upper Cretaceous in Hokkaido, Japan." ScienceDaily. ScienceDaily, 3 August 2021. <www.sciencedaily.com/releases/2021/08/210803121258.htm>.

RELATED STORIES

Climate Change Alters Tree Demography in Northern Forests

July 31, 2019 — The rise in temperature and precipitation levels in summer in northern Japan has negatively affected the growth of conifers and resulted in their gradual decline, according to a 38-year-long study in ...

Just How Old Are Animals?

May 30, 2017 — The origin of animals was one of the most important events in the history of Earth. Beautifully preserved fossil embryos suggest that our oldest ancestors might have existed a little more than half ...

New Study Identifies Ancient Shark Ancestors

Mar. 14, 2017 — New research based on x-ray imaging provides the strongest evidence to date that sharks arose from a group of bony fishes called acanthodians. Analyzing an extraordinarily well-preserved fossil of an ...

Conifer Cones Bear Their Ages Well, and Still Move It

Jan. 11, 2017 — Fossil conifer cones can still move their individual seed scales after millions of years, biologists have found. The cones analyzed in a new study represent the oldest known plant structures that are ...

FROM AROUND THE WEB

ScienceDaily shares links with sites in the TrendMD network and earns revenue from third-party advertisers, where indicated.

Large-sized theropod Spinosaurus: an important component of the carnivorous dinosaur fauna in southern continents during the Cretaceous

Carlos Roberto A. Candeiro et al., BSGF - Earth Sciences Bulletin, 2018

On the Cretaceous origin of the Order Syracosphaerales and the genus Syracosphaera

Paul R. Bown et al., Journal of Micropalaeontology, 2017

Vertebrate diversity of the Jehol Biota as compared with other lagerstätten

ZhongHe ZHOU et al., SCIENCE CHINA Earth Sciences, 2010

New thylacocephalans from the Cretaceous Lagerstätten of Lebanon

Sylvain Charbonnier et al., BSGF - Earth Sciences Bulletin, 2017

Assessing sampling of the fossil record in a geographically and stratigraphically constrained dataset: the Chalk Group of Hampshire, southern UK

Fiona M. Walker et al., Journal of the Geological Society, 2017

New species of Protochrysa(Neuroptera:Chrysopidae)from the Early Cretaceous of China

张天薇 et al., Journal of Environmental Entomology, 2020

Prostate Cancer Grades Can Be Distinguished Using MicroRNA Signature, Study Finds | Genomeweb

staff reporter, GenomeWeb

Amid Terrible End of Month for Stock Market, GenomeWeb Index Drops 7 Percent in February | Genomeweb

staff reporter, GenomeWeb

Free Subscriptions

Get the latest science news with ScienceDaily's free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

 [Email Newsletters](#)

 [RSS Feeds](#)

Follow Us

Keep up to date with the latest news from ScienceDaily via social networks:

 [Facebook](#)

 [Twitter](#)

 [LinkedIn](#)

Have Feedback?

Tell us what you think of ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

 [Leave Feedback](#)

 [Contact Us](#)

[About This Site](#) | [Staff](#) | [Reviews](#) | [Contribute](#) | [Advertise](#) | [Privacy Policy](#) | [Editorial Policy](#) | [Terms of Use](#)

Copyright 2021 ScienceDaily or by other parties, where indicated. All rights controlled by their respective owners. Content on this website is for information only. It is not intended to provide medical or other professional advice. Views expressed here do not necessarily reflect those of ScienceDaily, its staff, its contributors, or its partners.

Financial support for ScienceDaily comes from advertisements and referral programs, where indicated.