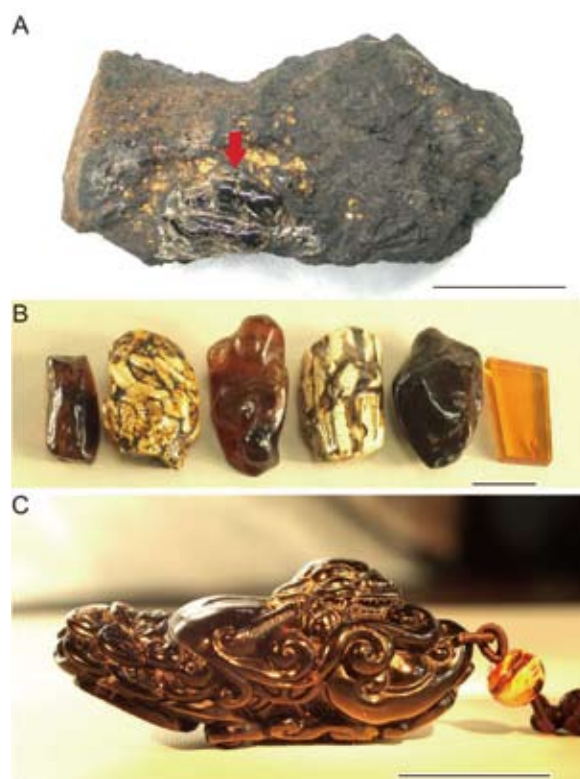


# Paleo-ecosystem Sealed in Amber: Paleobiota from Lower Eocene of Fushun, Northeastern China

Amber-bearing deposits are among the most important Konservat-Lagerstätten providing unique windows into past ecosystems. Fushun amber has been known for over a century and was traditionally regarded as an important source of medicine as well as organic gemstones. The inclusions, however, were not the subject of any comprehensive investigation and its paleobiota and scientific significance were inevitably overlooked in almost all mainstream paleontological literature.

After more than 110 years of mining, the opencast mine is closing in Fushun, ending the supply of amber. An international team of paleontologists, with abundant specimens collected in their fieldwork for over 20 years, now has a final opportunity to study this fossil resin and its inclusions before local knowledge fades and collections are dispersed.

The team, led by Prof. ZHANG Haichun from the Nanjing Institute of Geology and Palaeontology (NIGP), Chinese Academy of Sciences eventually reported a unique amber biota (50–53 million years ago) from the Lower Eocene of Fushun in northeastern China, which fills a large biogeographic gap in Eurasia. In the paper published in *Current Biology*, they determined that Fushun amber is derived from cupressaceous trees as supported by results from gas chromatography-mass spectrometry, infrared spectroscopy, and paleobotanical observations. From the amber inclusions, the authors identified a total of twenty-two orders and more than 80 families of arthropods, putting this amber biota among the most diverse known by humans. Moreover, the team discovered that an apparent radiation of ecological keystone insects including eusocial, phytophagous, and parasitoid lineages occurred at least



Fushun amber samples.

during the Early Eocene Climatic Optimum (EECO). Some insect taxa, they reported, seemed to have close phylogenetic affinities to those from coeval European ambers, suggesting a biotic interchange between the eastern and western margins of the Eurasian landmass during the early Paleogene.

Fushun amber contains the only Paleogene Asian (Laurasia-originated) arthropod biota that has sufficiently



numerous and diverse fossils to permit detailed investigation. It not only fills a crucial biogeographic gap in Eurasia, but spans the EECO, which is considered an important analogue for inferring future effects of warming trends on biotic interactions, making it a vital source of information for biotic change during the Paleogene.

This study represents the first detailed, comprehensive investigation for the Fushun amber. Based on thorough analyses of the material obtained in their long-term investigation, the paleontologists have so far identified abundant arthropod inclusions belonging to more than 80 families, making it amongst the most diverse amber biotas. In spite of the cessation of mining operations, the already gathered material is being studied and holds the potential for a deeper understanding of Paleogene biogeography and environmental change.

This research was supported by the Chinese Academy of Sciences, the National Basic Research Program of China and the National Natural Science Foundation of China.



Representative plants and insects in Fushun amber.

**For more information, please refer to:**

Wang B., Rust J., and Engel M.S., *et al.* (2014) A Diverse Paleobiota in Early Eocene Fushun Amber from China. *Current Biology*, 24(14): 1606–1610. doi:10.1016/j.cub.2014.05.048.

**View of the West Opencast Coalmine in Fushun, northeastern China.**

