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Research Advances

The First Vertebrate Assemblage Dominated by Fishes and Turtles of the Jehol Biota in Jilin Province, NE China

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Objective

The Early Cretaceous sediments are well-exposed in southern Jilin Province, and yield abundant invertebrate and plant fossils, including the typical *Eosestheria-Ephemeropsis trisetalis-Lycoptera* (E-E-L) assemblage of the Jehol Biota (Shao Tiequan et al., 2017). However, vertebrate fossils, especially tetrapods, are extremely rare and there is no formal documents on these fossils. Recently, a new fossil site dominated by fishes and turtles has been discovered in the middle part of the Hengtongshan Formation in Shuangmao Village, Xingling Town, Meihekou City, Jilin Province. Of these specimens, the turtle fossils are the first discovery from the Mesozoic in Jilin Province. Combined with several possible dinosaur bones, the vertebrate assemblage appears to have a high diversity, opening a new window into the biodiversity of the Jehol Biota in southern Jilin.

Methods

Almost complete fossils of several turtles and dozens of fishes have been previously collected by the Government of Xingling Town. During our field work, we measured the fossil-bearing section and two other nearby sections of the Hengtongshan Formation. Additional fossils of fishes, plants, bivalves and gastropods have been collected from the fossil site. The macrofossils are prepared in the Research Center of Palaeontology and Stratigraphy, Jilin University. Specimens are housed in the town hall of Xingling, Meihekou City and the Research Center of Palaeontology and Stratigraphy, Jilin University, respectively.

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Results

Most fossils were collected from a thick layer of grayish green sandstones from the section that represents a fluvio-lacustrine deposit. The fossil assemblage is dominated by fishes and turtles with only few collected gastropods, bivalves and plants. The fossil fishes are exquisitely preserved and they are identified as *Lycoptera davidi* and *Sinamia* sp. Some *Lycoptera* specimens with impressions of soft tissues are preserved in a cluster. The scales of *Sinamia* specimens are almost entirely preserved on several specimens. Three well-preserved turtle specimens, possibly representing a new species of *Ordosemys*, show characters of a circular shell, parallel-sided costals 3, relatively wide vertebrals, and two medial plastral fenestrae. Several fragmentary, relatively large fossil bones that lack typical aquatic/amphibian vertebrate characters are tentatively classified as dinosaurs (Fig. 1).

One poorly preserved bivalve specimen without any useful diagnostic characters has been collected. The gastropod specimens are identified as *Viviparus* sp. Numerous carbonized fossil plants have been found in the fossil section, however, only several fragments of *Baiera* sp. have been recognized.

All these recognized fossil taxa from the Xingling site are commonly found in the Jehol Biota. The E-E-L assemblage has been previously found in the lower and middle part of the Hengtongshan Formation and the underlying Dashatan Formation by the Geological Survey of Jilin Province (JBGMR, 1982). Because the upper part of the Hengtongshan Formation yields fossil assemblage comparable to both the Jehol Biota and the Fuxin Biota, its geological age is still open to debate (JBGMR, 1982). The middle part of the Hengtongshan Formation is considered

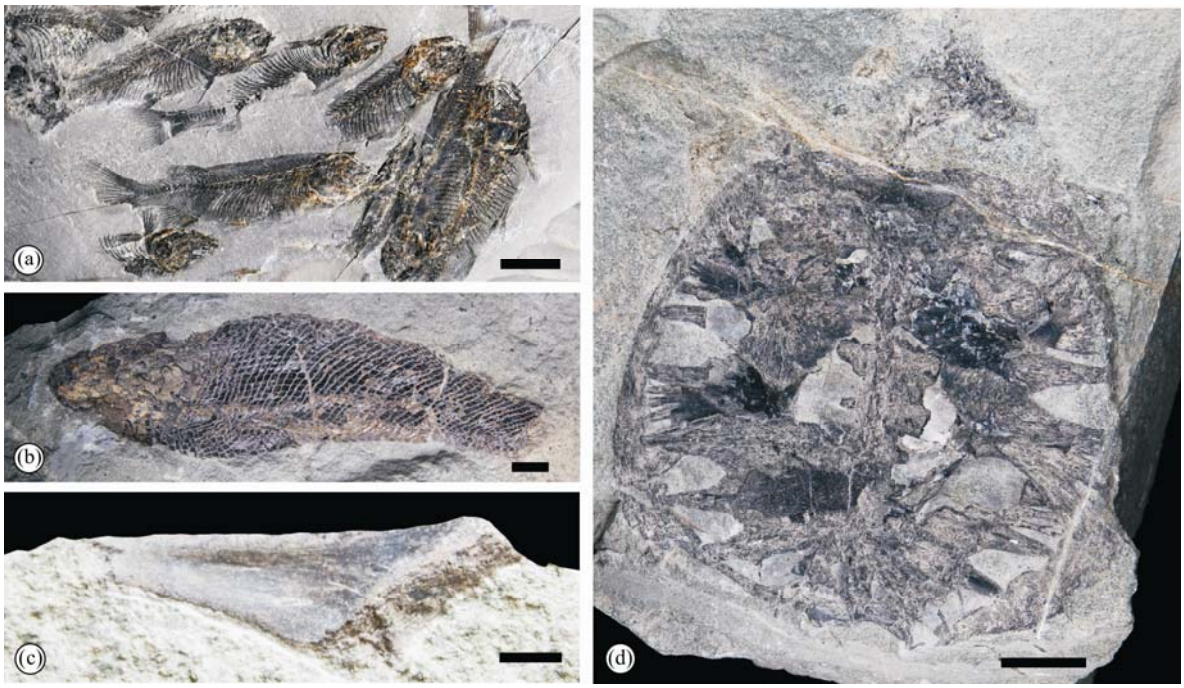

Fig. 1. The Early Cretaceous vertebrate assemblage discovered in Xingling, Meihekou, southern Jilin.
(a), *Lycoptera davidi*; (b), *Sinamia* sp.; (c), dinosaur bone; (d), *Ordosemys* sp. Scale bars are 2 cm.

as roughly equivalent to the Jiufotang Formation in western Liaoning Province in previous studies.

To date, other *Ordosemys* specimens have only been found in the Yixian Formation in western Liaoning Province. These specimens collected from the middle part of Hengtongshan Formation provide new information for understanding the diversity and paleogeographic distribution of *Ordosemys*.

Conclusion

The first vertebrate assemblage with fishes, turtles and possible dinosaurs of the Early Cretaceous Jehol Biota is found in southern Jilin, China. More importantly, the turtle fossils, representing a new species of *Ordosemys* and the first Mesozoic record from Jilin Province, provide a rare opportunity to study the taxonomical diversity and the paleogeographical distribution of *Ordosemys*. The possible dinosaur bones indicate a potential high diversity of terrestrial vertebrates in the Early Cretaceous Hengtongshan Formation at the Xingling site.

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References

Jilin Bureau of Geology and Mineral Resources (JBGMR), 1982. *Regional geology of Jilin Province*. Beijing: Geological Publishing House, 1–698 (in Chinese with English abstract).

Shao Tiequan, Zhang Hu, Wang Qi, Liu Yunhuan and Zhang Yanan, 2017. A Mesozoic Pompeii: History of the Jehol Biota’s rise and fall. *Acta Geologica Sinica* (English Edition), 91(5): 1893–1903.