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Research Advances

The First Discovery of the Easternmost Jehol Biota from Southeastern Jilin, China

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Objective

The Jehol Biota, a world-famous Early Cretaceous fossil Lagerstätte characterized by the traditional *Eosestheria-Ephemeropsis-Lycoptera* (EEL) assemblage, has a wide distribution over most parts of northern China, the coastal area of southeastern China, southeastern Mongolia, Transbaikalian area of Russia, Korea and Japan (Shao et al., 2017). The Baishan Basin, situated in southeastern Jilin is one of the easternmost Jehol Biota localities in China. Until now, the fossils here belonging to Jehol Biota have not yet been reported except for few fossils listed in geological survey reports. The fossil collections here are noteworthy in that they are the first fossil record documented from the Early Cretaceous Yingzuilazi Formation of the Baishan Basin, southeastern Jilin and the easternmost locality of Jehol Biota, China. This finding is important to explore the distribution, evolution and biodiversity of the Jehol Biota and even the Late Mesozoic terrestrial ecosystem, as well as for the division and correlation of the Late Mesozoic terrestrial strata.

Methods

During a series of field excursions, we measured the Yingzuilazi Formation in detail, discovered and gathered abundant well-preserved fossils. Fossils animals were identified by Niu Shaowu from Tianjin Institute of Geology and Mineral Resources (conchostracans), Sha Jingeng from the State Key Laboratory of Palaeontology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, CAS (bivalves), Zhang Lijun from Shenyang Institute of Geology and Mineral Resources (ostracods and gastropods), Rendong of Capital Normal University (insects), Wu Wenhao of Jilin University and Gao Keqin of Peking University (fishes and amphibians). Spores were analyzed by Zhang Shuqin of Jilin University. All specimens are stored in the Research Center of Paleontology and Stratigraphy of Jilin University, Changchun, China.

Results

Abundant fossil animals, including conchostracans, ostracods, bivalves, gastropods, insects, fishes and amphibians were collected from the Yingzuilazi Formation of the Baishan Basin, southeastern Jilin, China (Plate I 1-9). Three representatives of the Jehlo Biota, the conchostracan *Eosestheria*, the mayfly *Ephemeropsis* (=*Epicharmeropsis*) and fish *Lycoptera* have been recognized. Ostracods are represented by the *Cypridea* - *Lycopterocypris* - *Darwinula* assemblage. Elements of classic bivalve *Arguniella* - *Sphaerium* assemblage and gastropod *Probaicalia vitimensis* - *Reesidella robusta* assemblage, e. g., *Arguniella subcentralis*, *Arguniella lingyuanensis* and *Probaicalia vitimensis* are also discovered. Another kind of insect is identified as *Sinochresmoda magnicornia*. A new species of a new genus of amphibians have also been recognized based on the primary study. This new discovery documents the first Mesozoic salamander form Jilin Province and the easternmost occurrence of Mesozoic salamanders in Asia. The faunal collections obviously belong to *Eosestheria* - *Epicharmeropsis* - *Lycoptera* (EEL) assemblage of the Jehol Biota in the Early Cretaceous Yixian Formation of weastern Liaoning and northern Hebei.

Plants are characterized by Sphenopsida, Filicopsida,

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Cycadopsida, Ginkgopsida, Czekanowskiales, Coniferopsida, Gentopsida and Fructus et Semina. New materials of *Solenites* (Czekanowskiales) and *Baiera* (Ginkgoales) have been published (Plate I 10-11; Li et al., 2015; Zhao et al., 2016). The palynomorph assemblage shows a typical aspect of Early Cretaceous palynofloras, which is dominated by *Cicatricosisporites*, one of relatively typical taxa groups from the Early Cretaceous.

Such a fossil assemblage comprising vertebrates, invertebrates, plants and spores is characteristic of the second phase of the Jehol Biota corresponding to Yixian Formation and its lateral equivalents.

Conclusion

The Early Cretaceous Jehol Biota characterized by *Eosestheria* - *Epicharmeropsis* - *Lycoptera* (EEL) assemblage was first discovered from the Yingzuilazi Formation of the Baishan Basin, southeastern Jilin. It is one of the easternmost Jehol Biota localities in China. This find is important to explore the distribution, evolution and biodiversity of the Jehol Biota and even the Late Mesozoic terrestrial ecosystem. The age of the Yingzuilazi Formation should be the Early Cretaceous, rather than the Late Jurassic. It gives new insight for the division and correlation of the Late Mesozoic terrestrial strata.

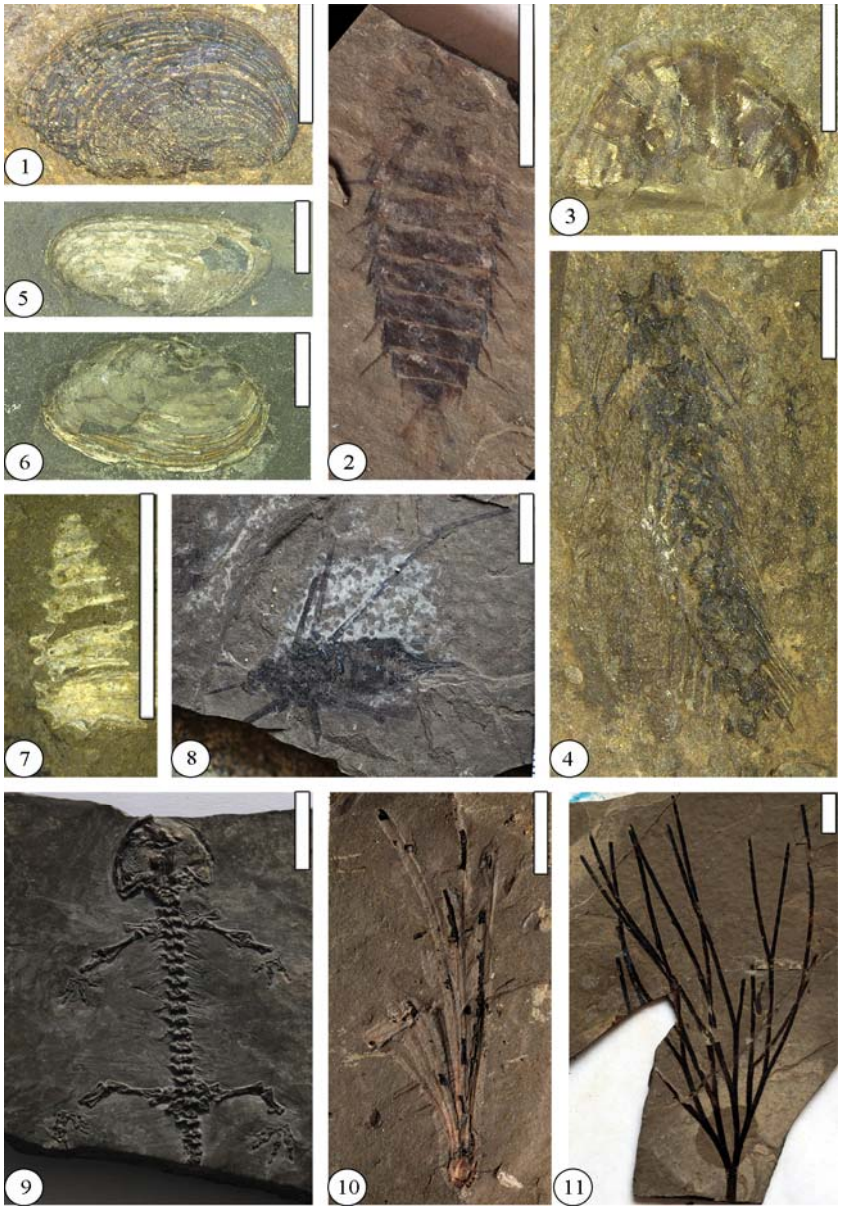


Plate I. Selected fossils of easternmost Jehol Biota from southeastern Jilin, China.
1, *Eosestheria*; 2, *Epicharmeropsis*; 3, 4, *Lycoptera*; 5, *Arguniella subcentralis*; 6, *Arguniella lingyuanensis*; 7, *Probaicalia vitimensis*; 8, *Sinochresmoda magnicornia*; 9, Amphibian; 10, *Solenites baishanensis*; 11, *Baiera baishanensis*. 1, 3, 5–7, bar=5 mm; 2, 4, 8–11, bar=1 cm.

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References

Li Yunfeng, Sun Chunlin, Li Tao, Na Yuling, Chen Yuejun and Xing Dehe, 2015. *Solenites* (Czekanowskiales) from the Late Mesozoic Jehol Biota of southeastern Jilin, China and its paleoclimatic implications. *Acta Geologica Sinica* (English Edition), 89(4): 1088–1102.

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.

Zhao Miao, Sun Chunlin, Dilcher, D.L., Na Yuling and Xing Dehe, 2016. A new species of *Baiera* from the Early Cretaceous Jehol Biota of southeastern Jilin, China. *Palaeoworld*, 25 (2): 251-262.