Research Advances

The First Discovery of *Eosestheria* in Eastern Liaoning, China

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Objective

The Jehol biota refers to a flora and fauna that thrived in the Early Cretaceous (Shao Tiequan et al., 2017), and *Eosestheria* is an important component of the Jehol biota and is also an important link in the biota chain during its production period. A large number of fossils of Jehol biota have been discovered in northern Hebei, western Liaoning, and later in northwest China, central and western Inner Mongolia (Li et al., 2016), the Korean Peninsula, and Japan. Based on this, Chen Peiji (1999) proposed that the distribution and diffusion of the Jehol biota are in northwest China and the central and western regions of Inner Mongolia in the middle and late stage.

Fig. 1. *Eosestheria* fossil identified in eastern Liaoning Province. (a) Macroscopic morphology of the fossil; (b) outer membrane of the left flap of *Eosestheria*; (c) outer membrane of the right flap of *Eosestheria*.

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However, no evidence of the existence of Jehol biota has been found in eastern Liaoning. Based on geological surveys in eastern Liaoning, we discovered a single fossil of *Eosestheria* in eastern Liaoning. This discovery is of great significance for studying the distribution, development, diffusion, sedimentary environment, stratigraphic division and correlation of the Jehol biota.

**Methods**

A set of sedimentary rock systems in the Wenzhigou area of Erhulai Town, Huanren County, Benxi City, and Liaoning Province were surveyed. The formation was identified as Lishugou Formation. Dozens of fossils of *Eosestheria* were collected from a gray-black tuffaceous siltstone specimen in the lower part of the Lishugou Formation (Fig. 1a). Well-decorated and preserved fossils were selected for further analysis and identification.

**Results**

The fossils were first discovered on the northwest side of Wenzhigou village by Professor Wang Mincheng, a member of the project team. The fossil has the following characteristics: the shell petal is of a medium size and oval. The fossil is 11 mm in length and 7 mm high. The back edge is short and straight, and the top of the shell is near the front. The front and rear edges are round, the ventral edge is straight, and the front and back height are nearly equal. The shell is also slightly bulged. The growth band is sparse and consists of 15–18 bands. The area near the back and front edges of the growth belt has a large irregular polygonal grid-like decoration. The grid lines are thin and weak, and the decoration of the ventral and trailing edge is unclear (Figs. 1b–c). The fossil was named *Eosestheria* sp. Compared with the typical *Eosestheria* in western Liaoning, the fossil has the same characteristics of shape, growth belt and grid lines, and is only slightly smaller in individual size. This indicates that Lishugou Formation was formed in the Early Cretaceous and can be compared with upper Yixian Formation and lower Jufotang Formation in western Liaoning.

**Conclusion**

The first discovery of the *Eosestheria* in eastern Liaoning confirms the existence of Jehe biota in this region. The Lishugou Formation was established in the Early Cretaceous. This expands the distribution range of the Jehol biota and provides a further description of the diffusion pathway to the Korean Peninsula and Japan. It is speculated that in the process of the diffusion of the Jehol biota from the western Liaoning to the eastern Liaoning, it has maintained basic decorative features, but the individual size has gradually become smaller. This additionally provides a reliable basis for the comparison of the Mesozoic stratigraphic between eastern and western Liaoning.

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**References**

