

# Advances in the Study of the Non-Marine Ostracods in Luanping Basin, Northern Hebei (North China): A Preliminary Result

Zuohuan Qin<sup>1,2</sup>, Dangpeng Xi<sup>1\*</sup>, Benjamin Sames<sup>2</sup>, Qiqing Pang<sup>3</sup>, Xiaoqiao Wan<sup>1</sup>

<sup>1</sup>State Key Laboratory of Biogeology and Environmental Geology, China University of Geosciences, Beijing, China

<sup>2</sup>Department of Geodynamics and Sedimentology, University of Vienna, Vienna, Austria

<sup>3</sup>Hebei GEO University, Shijiazhuang, China

Email: \*xdp1121@163.com

**How to cite this paper:** Qin, Z.H., Xi, D.P., Sames, B., Pang, Q.Q. and Wan, X.Q. (2019) Advances in the Study of the Non-Marine Ostracods in Luanping Basin, Northern Hebei (North China): A Preliminary Result. *Open Journal of Geology*, 9, 601-604.

<https://doi.org/10.4236/ojg.2019.910052>

**Received:** August 16, 2019

**Accepted:** September 20, 2019

**Published:** September 23, 2019

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## Abstract

The Luanping Basin of northern Hebei, North China, is well known for its continuous nonmarine Lower Cretaceous deposits and the preservation of the Jehol Biota. However, there are still some controversies about the stratigraphic correlation in these regions. Here we report some advances on the study of the nonmarine ostracods of Luanping, focusing on its biostratigraphical utility. Preliminary results indicate that the nonmarine ostracods from Luanping Basin consist of 17 genera and around 44 species. The ostracod assemblages of the Dabeigou, Dadianzi and Xiguayuan formations of this Basin can be assigned to the *Luanpingella-Ocrocypris-Eoparacypris* (Late Valanginian-Early Hauterivian age), *Cypridea-Timiriasevia-Daurina* (Late Huaterivian-Barremian age) and *Cypridea-Limnocypridea-Lycopteroocypris* (Aptian stage) zones, respectively. This temporary framework can be served as a stratigraphic correlation tool in northern Hebei, as well as contributed to a better understanding of the evolution of the Jehol Biota.

## Keywords

Ostracoda, Biostratigraphy, Luanping Basin, Early Cretaceous, Jehol Biota

## 1. Introduction

The Jehol Biota represented a diverse ecosystem in the Cretaceous world, particularly with respect to the high diversity and abundance of fossil species [1]. The study of the Jehol Biota has mainly focused on the Yixian and Jiufotang formations of Western Liaoning, China, which represent the middle and late stage of this biota [2]. The early Jehol Biota and its relevant strata, however, remain to be

studied further [3]. The Luanping Basin and other basins in the northern Hebei Province, China, preserve abundant fossils of the early Jehol Biota, including non-marine ostracods [2]. Detailed fieldwork on representative sections of the Lower Cretaceous Dabeigou, Dadianzi and Xiguayuan formations of the Luanping Basin have revealed a diverse ostracod fauna with ostracods occurring frequently in the sections and in high abundance [4] [5] [6] [7]. Previous taxonomical and biostratigraphical analyses of the ostracods contribute to the improved age assignment and correlation of respective formations, the correlation with the relevant stage of the Jehol Biota, and on the controversy on the position of the J-K boundary in the Luanping basin and adjacent basins [8]. These studies demonstrated the need for more detailed work and thorough taxonomical revision of the ostracod fauna and its biostratigraphical and paleoenvironmental utility.

## 2. Materials and Methods

In an ongoing PhD project, detailed studies on relevant sections of the Dabeigou (Yushuxia section), Dadianzi (Shangying-Xiaying section), and Dadianzi or Xiguayuan (Liyang section) formations of the Luanping Basin are carried out, including high-resolution measuring and sampling for microfossils as well as detailed sedimentological descriptions to establish the lithostratigraphic framework.

## 3. Results and Discussion

Preliminary taxonomic analysis of non-marine ostracods from the Lower Cretaceous interval of Luanping Basin revealed (depending on sections and formations) 7 - 17 genera, including *Cypridea*, *Yumenia*, *Luanpingella*, *Pseudoparacypridopsis*, *Daurina*, *Yanshanina*, *Ocrocypris*, *Eoparacypris*, *Limnocypridea*, *Djungarica*, *Darwinula*, *Alicenula*, *Rhinocypris*, *Timiriasevia*, *Damonella*, *Lycopteroocypris* and *Mongolianella*, and around 44 species (Detailed discussion will be on another paper). Fieldwork on the Lower Cretaceous interval of the Liyang section, the stratigraphical assignment of which either to the Dadianzi or the Xiguayuan Formation is still debated, revealed abundant fossils of gastropods, bivalves, ostracods, spinicaudatans, fishes, shrimps and plants. The ostracod biostratigraphy of the Dabeigou, Dadianzi and Xiguayuan formations can be recognized as the *Luanpingella-Ocrocypris-Eoparacypris* (Late Valanginian-Early Hauterivian age), *Cypridea-Timiriasevia-Daurina* (Late Hauterivian-Barremian age) and *Cypridea-Limnocypridea-Lycopteroocypris* (Aptian stage) assemblage zones, respectively. In addition, the ostracod assemblage zone of the Dadianzi Formation can be subdivided into the *Cypridea stenolonga*, *C. luanpingensis*, *C. sulcata*, and *C. pangi* subzones, which mainly distributed at members 1 - 4 of this formation, respectively. Based on biostratigraphic correlations of the Dadianzi Formation to stratigraphically equivalent formations of adjacent basins, it is concluded that the earliest occurrence of *Cypridea*-species

in the northern Hebei-western Liaoning area, North China, is ~130 Ma (lowermost Barremian).

#### 4. Conclusions

Based on preliminary analysis, 17 genera and around 44 species of the nonmarine ostracods from the Lower Cretaceous interval of Luanping Basin have been recognized.

The ostracod assemblages of the Dabeigou, Dadianzi and Xiguayuan formations of Luanping Basin have been temporarily proposed as the *Luanpingella-Ocrocypris-Eoparacypris* (Late Valanginian-Early Hauterivian age), *Cypri-dea-Timiriasevia-Daurina* (Late Huaterivian-Barremian age) and *Cypri-dea-Limnocypridea-Lycoptero-cypris* (Aptian stage) zones, respectively.

#### Acknowledgements

This work was supported by the National Natural Science Foundation of China (41688103, 41790452, 41302008, 41172037), the Program of China Geological Survey (DD20190009, DD20160207), as well as the Austrian Science Fund (FWF) project P 27687-N29 (to BS). Zuohuan Qin was also supported by the Chinese Scholarship Council. The authors have benefitted greatly from the discussions with Yaqiong Wang, Chunlin Sun, Shaowu Niu, Xiaomin Fang and Xuri Wang. We also sincerely thank Yankang Xu, Feng Wei, Xinhua Li, Xuetao Li, Fei Xu, Junjie Zhou, Cong Ding, Zhiqiang Yu, Qian Zhang, Guannan Wang, Anqi Gu, Xin Xiong, Baoxu Wu, Yunqi Ye, Xuejiao Wang, Muhammad Kamran, Jizhe Du, Daben Deng and Jialiang Dai for their help in the field. This is a contribution to UNESCO/IUGS/IGCP 679 project.

#### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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