Review of "*Cyclocarya scutellata* Guo" *

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Abstract: "*Cyclocarya scutellata* Guo" is a new species described by Guo (1979) from the Changchang Formation (Eocene) of the Changchang Basin on Hainan Island, China. But based on the fruit stalk, size, and so-called "winged venation", the authors think these specimens could be lotus fruit fossils representing different preserved states and should not be classified into *Cyclocarya*. Therefore, the proposition of Guo (1979) that *Cyclocarya* probably originated in Hainan Island in the Eocene epoch is not supported by the fossil record.

Key words: *Cyclocarya scutellata* Guo; Changchang Formation; Eocene; Hainan Island, China
CLC number: Q914.8 **Document code**: A **Article ID**: 0529-6579 (2009) 02-0149-02

"圆盘青钱柳 *Cyclocarya scutellata* Guo" 论评

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摘 要: 圆盘青钱柳 *Cyclocarya scutellata* Guo 为郭双兴 (1979) 建立于海南岛长昌盆地长昌组的新种，但根据果柄、果的大小以及所谓的"翅脉"等特征，作者认为郭双兴 (1979) 建立的"圆盘青钱柳 *Cyclocarya scutellata* Guo" 并不成立，这类标本应是莲的果实的不同保存状态，不能归入 *Cyclocarya*。因此，郭双兴 (1979) 提出的关于青钱柳属可能起源于海南岛始新世的推论也就缺乏化石依据。

关键词: 圆盘青钱柳 *Cyclocarya scutellata* Guo; 长昌组; 始新世; 海南岛
中图分类号: Q914.8

1 Introduction

"*Cyclocarya scutellata* Guo" is a new species described by Guo from the Changchang Formation (Eocene) of the Changchang Basin on Hainan Island, China. The species is described as follows: "winged fruits, wings shaped as leather-like disks with diameter of 5 ~ 5.6 cm. The wing venation consists primary to tertiary fine veins, extending from the center to margins with some twists. The margin is irregular undulate. Seed is in the center with residual trace of perianth." Based on the fact that *Cyclocarya* Iljinskaja fossils are mainly found in Oligocene and Miocene strata from the Republic of Kazakhstan and Japan, the author further proposed that this genus should be native to Hainan Island, China during Eocene. Later on, due to environmental changes, it migrated north to all the aforementioned places and has become native to areas south of the Yangtze River[1].

2 Review of "*Cyclocarya scutellata* Guo"

In recent years, we have collected many such fossil specimens in the same area and the same stratum. After careful examination of our collections, the specimen images described by Guo (1979)[1] and the specimens preserved in the Nanjing Museum of Palaeontolo-

* 收稿日期: 2008-09-02
基金项目: 国家自然科学基金资助项目 (40672017), NSFC-RFBR 基金资助项目 (40811120033, 07-04-92127), 教育部直属高校聘请外籍教师重点基金资助项目 (2008) 和广东省自然科学基金资助项目 (06023161)
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gy, we raise some questions about the description of the winged venation and the seeds. First, the so-called "winged venation" from all the collections is very fine, dense, and irregular, which is different from the description of the counterparts in *Cyclocarya* during the Tertiary period found in Russia and the Republic of Kazakhstan, as well as other places. Neither do they match the winged venation of *Cyclocarya paliurus* (Batal.) Iljinskaja, which in our collections has no such structure. Based on our observations, the so-called "winged venation" is not the venation of winged fruits; neither is the "leather-like disk" the fruit wing. Secondly, the tissue preserved in the center of the specimen is not seed because it does not have a residual perianth trace. Instead, these marks could have been left after falling off a lotus fruit stalk. In the new specimen we have collected, the so-called middle seeds were often preserved as carbonated partial fruit stalks (Fig. 1a), while the specimen buried on its side had a longer fruit stalk (Fig. 1b). In addition, the size of these specimens is not homogenous; the biggest one has a diameter of 10 cm, which is markedly different from *Cyclocarya* winged fruit.

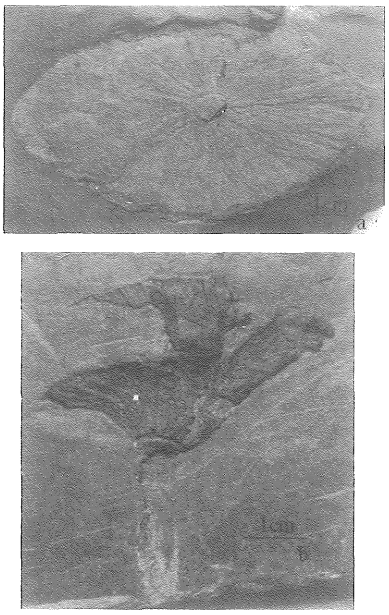

Fig. 1 (a) mid-section of carbonated partial fruit stalk; (b) side view of long fruit stalk. (Specimen number CCF005 and CCF006, currently preserved in the Museum of Biology, Sun Yat-sen University.)

Based on the above analysis, it is oncluded that the classification of *Cyclocarya scutellata* Guo according to the fruit stalk, size, and so-called "winged venation" is not scientifically sound. These specimens could be lotus fruit fossils representing different preserved states and should not be classified into *Cyclocarya*. Therefore, the proposition of Guo (1979) that *Cyclocarya* probably originated in Hainan Island in the Eocene epoch is not supported by the fossil record.

Last, but least important, is that Budantsev (1994) summarized the large number of fossils from leaf, winged fruits, and endocarp of *Cyclocarya* plants found in Russia and adjacent states [2]. More than 10 species were widely distributed in Far East, Siberia, and the European portion of Russia, The Republic of Kazakhstan, and Japan. Most of them are contained in strata from the Oligocene to Miocene. Among the three described new species, *C. pacifica* Fotjanova was found in Far East Russia in the Eocene, which is comparable to the stratum of the Changchang Formation in Hainan Island. The known information on *Cyclocarya* fossils in Far East and Siberia of Russia suggests that strata bearing this species should span from the Eocene, through the Oligocene and Miocene, until the Pliocene epoch. It is thus reasonable to predict that this region should be the center for the origin and early evolution of *Cyclocarya*.

Acknowledgements The graduate students majoring in Plant Science at Sun Yat-sen University participated in the field collection of the fossils.

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