

The Qingjiang biota –An extraordinary new Burgess Shale-type fossil Lagerstätte from the early Cambrian of South China

*Dongjing Fu¹, Xingliang Zhang¹, Robert R. Gaines²

1. State Key Laboratory of the Continental Dynamics, Shaanxi Key Laboratory of Early Life and Environment, Department of Geology, Northwest University, Xi'an 710069, PR China, 2. Department of Geology, Pomona College, Claremont, CA 91711, USA

Our understanding of the Cambrian explosion and of the fundamental structure of the tree of animal life rests in large part on evidence from a dramatically enhanced fossil record, characterized by the preservation of entire assemblages of soft-bodied fossils. In the one hundred years since Walcott's original discovery of the Burgess Shale, exceptionally preserved fossil assemblages have been reported from Cambrian strata of almost every paleocontinent. Nevertheless, only the early Cambrian Chengjiang biota of Yunnan Province has matched the Burgess Shale in total diversity of soft-bodied taxa and fidelity of exceptional preservation. Here, we report the discovery of an extraordinary new early Cambrian Burgess Shale-type (BST) fossil Lagerstätte from the Changyang area of South China, which is characterized by high taxonomic diversity (101 metazoan taxa plus 8 algal forms), an unexpectedly large proportion of new taxa (53.2%), and exquisite preservation of fine aspects of labile tissue anatomy. The taxonomic richness of soft-bodied taxa (85%) approaches the top tier of BST deposits, presently occupied only by the Burgess Shale and Chengjiang biotas. Rarefaction analyses suggest that diversity may surpass all other BST biotas. Novel aspects include high abundance of cnidarians, including both medusoid and polypoid forms, new taxa resembling extant kinorhynchs, and abundant larval or juvenile forms. While approximately coeval to the Chengjiang biota, the Qingjiang biota (518 Ma) appears to have occupied a more distal environmental setting, in which a different early Cambrian ecosystem flourished. The uniqueness of the Qingjiang biota in the taxon composition and preservation quality holds special potential to provide new insights into the evolution of early metazoans and the structuring of Cambrian ecosystems across environmental gradients.

Keywords: Qingjiang Biota, Cambrian Explosion, Exceptional Preservation, South China, Burgess Shale Type

