

# FIRST DEFINITE RECORD OF PERMIAN EDRIOASTEROIDS: *NEOISOROPHUSSELLA MASLENNIKOVI* N. SP. FROM THE KUNGURIAN OF NORTHEAST RUSSIA

COLIN D. SUMRALL

Department of Geological Sciences, University of Tennessee, Knoxville 37996, USA, <csumrall@utk.edu>

## INTRODUCTION

THE LATE history of edrioasteroids has come to light only in the last 40 yr. When the edrioasteroid chapter of the Treatise on Invertebrate Paleontology was published (Regnéll, 1966) the youngest known edrioasteroids were upper Mississippian (Chesterian). Since that time, a series of papers have described edrioasteroids in the Pennsylvanian (Fraunfelter and Utgaard, 1970; Bell, 1976; Sumrall, 1992; Sumrall and Bowsher, 1996; Sumrall et al., 2000, 2006). Pennsylvanian edrioasteroids now include nine species distributed among six genera, including one fauna bearing four genera (Sumrall et al., 2006). These edrioasteroids are not limited to a single clade but include postibullinids, plesiomorphic agelacrinitids, and derived clavate discocystinids.

The Permian record of edrioasteroids is sketchy at best. There is a single published report of “upper Permian” edrioasteroids from the Verkhojansk Region of Northeast Russia (Arendt, 1983). This abstract provides a brief account of two specimens with some stratigraphic data, though no formal diagnosis, description, or illustration was provided. A fragment of a possible second Permian edrioasteroid was shown to the author by J. Savill in 2008 from collections made in Timor. This specimen was too poorly preserved to be identified with certainty as an edrioasteroid, but the preserved morphology was suggestive.

Such range extensions are not unexpected with increased collecting activity. The discovery of several echinoderm taxa in strata significantly younger than previously thought is a common pattern in Paleozoic echinoderms. In recent years the stratigraphic range of stylophorans has been extended from the Upper Devonian to Lower Pennsylvanian (Kolata et al., 1991), protocrinid diploporans from the Middle Ordovician to the Middle Devonian (Sumrall et al., 2009), eocrinoids from the Upper Ordovician to the lower Silurian (Frest, 2005), and unpublished reports of cyclocystoids extending their range from upper Devonian to upper Mississippian (Guensburg, personal commun., 1992). The discovery of these taxa and the documentation of Permian edrioasteroids strongly suggest that the upper Paleozoic is poorly sampled for many echinoderm clades, and that it is probable that several more of these Paleozoic lineages may have persisted to the end Permian Mass Extinction.

## RUSSIAN EDRIOASTEROIDS

Several Russian edrioasteroids have been described from the Ordovician, including *Rhenopyrgus* Dehm, *Cyathocystis* Schmidt, and *Cyathotheca* Jaekel (Regnéll, 1950). Post-Ordovician edrioasteroids from Russia are poorly known. To date, only two species have been mentioned in the literature—*Lepidodiscus ephraemovianus* (Bogolyudov, 1926) from the Devonian of the Tula District and “*Yakutidiscus maslennikovii*” (Arendt, 1983) herein *Neoisorophusella maslennikovii* n. sp. from the Lower Permian of the Verkhojansk

Region. An additional as yet undescribed species of *Krama* Bell is also known from the Devonian of Russia (S. V. Rozhnov, personal commun., 2002).

*Agelacrinites ephraemovianus* Bogolubov was extensively reviewed by Gekker (1940) and Regnéll (1950), who illustrated additional material and thoroughly revised the species. Reanalysis of these specimens shows them to be *Lepidodiscus ephraemovianus* (Bogolubov) as suggested by Regnéll (1950), based on a pyrgate theca with a wide disorganized pedunculate zone, cover plates arranged into six-plate repeating patterns, the ambulacral curvature with four counterclockwise and one (C) clockwise arms, and imbricate ambulacral flooring plates (Sumrall, 1996). This species is known from the Upper Devonian of the Tula district, Russia, from a limestone hardground bearing the brachiopod *Spirifer archiaci* Bogolyudov. *Lepidodiscus ephraemovianus* marks the earliest-known occurrence of *Lepidodiscus* and the only one known from Russia.

“*Yakutidiscus maslennikovii*” (Arendt, 1983) from the Permian Verkhojansk Region was named in a short paper without diagnosis or illustration and is consequently a nomen nudum. It was described along with a second specimen named “*Yakutidiscus (?) yeltyshevae*,” which co-occurred attached to the same substrate—a piece of bivalve or cephalopod internal mold. These two species are here interpreted to be conspecific based on their overall similarity and belong in *Neoisorophusella* Kammer, Tissue, and Wilson. This species is also the first reported edrioasteroid from Asia.

*Stratigraphy*.—Because *Neoisorophusella maslennikovii* n. sp. is described as the youngest known isorophid edrioasteroid, it is imperative to fully document its stratigraphic position. According to Arendt (1983) the two specimens of *N. maslennikovii* were attached to a single bivalve or cephalopod internal mold collected in 1975 by V. V. Maslennikov. These specimens were obtained from the Bytantay River basin, near the mouth of the Billiak River in the Verkhojansk region of Yakutia, northeast Russia. The Billiak River is a small tributary of the Yana River. The specimens were collected from the lower portion of the upper Turnarinia horizon described therein as corresponding to the Artinskian or lower Kungurian of the Upper Permian (now known to be Lower Permian (Klets et al., 2006; Kutugin, 2006)). The unit from which these fossils were collected lies some 2 km up from the base of the Permian section locally.

Since the collection of *Neoisorophusella maslennikovii*, much work has been done on the Permian stratigraphy of the Verkhojansk region (Klets et al., 2006; Kutugin, 2006). The Tumara Formation has been subdivided into smaller units. The Lower Tumara Subformation is now called the Orol Formation and is considered to be of early Kungurian age. The Upper Tumara Subformation was divided into the Takamkyt Formation (late Kungurian) and the black branch Kadachan Formation (Ufimian) (Klets et al., 2006; Kutugin, 2006). The edrioasteroids were collected from the Takamkyt