# Supplementary Material: Systematic Paleontology

The holotypes of each synonymized species are re-illustrated from their original publication in Supplementary Figure 1. Newly designated paratypes for each synonym are also displayed. Abbreviations include OSU (Ohio State University) and ISGS (Illinois State Geological Survey).

Class Conodonti Branson, 1938

Order Ozarkodinida Dzik, 1976

Superfamily Polygnathacea Bassler, 1925

Family Idiognathodontidae Harris and Hollingsworth, 1933

Genus *Neognathodus* Dunn, 1970

Type species.*—Polygnathus bassleri* Harris and Hollingsworth, 1933, O. D. Dunn,1970from the Cromwell Member of the Wapanucka Formation (Pennsylvanian) in Pontotoc County, Oklahoma.

*Neognathodus* *medadultimus* Merrill, 1972

Supplementary Figure 1. A-H

1944 *Streptognathodus* sp.; Branson, p. 305, Pl. 44, fig. 40.

1962 Gnathodus *bassleri* (Harris and Hollingsworth 1933); Mamay and Yochelson, p. 209, Pl. 34, fig. 45.

1965 *Gnathodus* *roundyi* (Gunnell 1931); Murray and Chronic, p. 598, Pl. 71, figs. 1-2, 5-6 only.

1967 *Gnathodus* cf. *roundyi* (Gunnell 1931); Koike, p. 299-300, Pl. 1, figs. 27-28.

1967 *Streptognathodus* *columbiensis* n. sp.; Stibane, p. 336, Pl. 36, figs. 3-5 only.

1967 *Streptognathodus* *asymmetricus* n. sp.; Stibane, p. 335-336, Pl. 36, figs. 14-18 only.

1970 ?*Neognathodus* *roundyi* (Gunnell 1931); Dunn, Text-fig. 4.

1971 *Gnathodus* n. sp.; Merrill, p. 409, Pl. 1, fig. 22.

1971 ?*Gnathodus* *bassleri* *bassleri* (Harris and Hollingsworth 1933); Lane and Straka, p. 402, Pl. 1, fig. 10.

1971 *Neognathodus* n. sp. B; Merrill and King, p. 660.

1971 *Neognathodus* n. sp. C; Merrill and King, p. 660, Pl. 76, figs. 5-6.

1972 *Neognathodus* *medadultimus* n. sp.; Merrill, p. 824-825, Pl. 1, figs. 2-7, Pl. 2, fig 19.

1972 *Neognathodus* *medexultimus* n. sp.; Merrill, p. 825-826, Pl. 1, fig. 1, Pl. 2, figs. 20-26.

*Holotype.—*Original type specimens for *N. medadultimus* remain; these include the holotype (OSU 28435 in Merrill, 1972, p. 824-825, Pl. 1. fig. 6) and three paratypes (OSU 28430, 28433, and 28436 in Merrill, 1972, p. 824-825, Pl. 1. figs. 4, 5, and 7, respectively). The former holotype (OSU 28444, in Merrill, 1972, p. 825-826, Pl. 2. fig. 23) and three paratype specimens (OSU 28440, 28442, and 28437 in Merrill, 1972, p. 825-826, Pl. 2. figs. 22, 25, and 26 respectively) for *N. medexultimus* are designated here as *N.* *medadultimus* paratypes. Both original and new type specimens are from the Vanport and Putnam Hill members of the Allegheny Formation (Desmoinesian) in eastern Ohio and western Pennsylvania.

*Diagnosis*.*—*Outer posterior parapet is present and long enough to possess more than one node, but fuses with the carina before the posterior terminus of the carina. Maximum outer parapet is the primary criteria to differentiate between *N.* *medadultimus* and *N.* *bothrops*, where both the inner and outer posterior parapets fuse with the carina at the carina terminus. Minimum outer parapet length is the main criteria to differentiate *N.* *medadultimus* from *N.* *roundyi*, where the outer parapet is very short and can only accommodate one node.

*Occurrence*.*—*Stratigraphic range includes the Desmoinesian (Moscovian) and geographic range includes Midcontinent, Appalachians, and New Mexico of North America, Moscow Basin, and Amazon Basin.

*Description*.*—* Follows Merrill (1972). In oral view, the platform is gently bowed and roughly lanceolate with the greatest width in the anterior third. The platform is pointed to broadly rounded posteriorly. The blade, which is relatively straight, continues as a straight to slightly sinuous carina to the posterior terminus of the platform. The outer parapet is either parallel to or flaring away from the carina in anterior section and closes toward the carina in posterior half of platform so that nodes of this parapet fuse with the carina nodes to form a single row of nodes in the posterior half of the platform. The outer nodes extend transversely on the platform. The inner row of nodes also extends transversely, and in many specimens the nodes almost become transverse ridges. Nodes sometimes arranged in radial pattern and ornament the inner parapet that extends to the posterior end of platform where it fuses with the terminal node of the carina. A trough-like groove on the inner side of carina extends almost the entire length of the platform and can shallow posteriorly. The corresponding groove on the outer side shallows and terminates posteriorly as the outer parapet and carina merge.

 In lateral view, the parapets, whether discrete or fused are high, are almost as high as the carina. The platform can be slightly higher or lower than the platform width, with vertical to slightly overhanging sides and rear. The blade is high and the highest denticle is located along the anterior third of the platform.

 In aboral view, the platform is excavated broadly and deeply. Both maxima occur in the anterior third of the platform, and the outer side is less expanded laterally than the inner. Narrow flanges border both sides of the platform. The entire basal cavity extends anteriorly as a groove along the aboral edge of blade.

*Etymology*.*—*Latin, *media*, middle, and *ad*, toward, and *ultima*, end; meaning from the middle toward the terminus. Overall, name refers to the region of the platform where the outer row of nodes along the parapet fuses with eh carina (follows Merrill, 1972).

*Remarks*.*—*The degree of fusion of the outer posterior parapet with the carina is variable, and synonymizing *N.* *medadultimus* and *N. medexultimus* incorporates this variation. The number of nodes along the outer parapet is somewhat variable. The rows of nodes along the outer parapet can also vary, as the nodes may become more tightly fused posteriorly or may remain as separate node pairs (follows Merrill, 1972).

*Neognathodus* *dilatus* Stauffer and Plummer, 1932

Supplementary Figure 1. I-M

1932 *Gnathodus* *dilatus* n. sp.; Stauffer and Plummer, p. 40-41, Pl. 4, figs. 10-11, 13-14.

1949 *Cavusgnathus* sp.; Sturgeon and Youngquist, p. 383, Pl. 74, fig. 13.

1971 *Neognathodus* *dilatus* (Stauffer and Plummer 1932); Merrill and King, p. 660-661, Pl. 76, fig. 1.

1972 ?”Terminal” neognathodids; Merrill, p. 826, Pl. 2, figs. 1-2.

1975 *Neognathodus* *metanodosus* n. sp.; Merrill, p. 722, Fig. 1C.

*Holotype.—* Original type specimens for *N. dilatus* remain; this includes the two lectotypes and two paratypes that were assigned with the species designation (Stauffer and Plummer, p. 40-41, Pl. 4, figs. 10-11 for lectotypes and 13-14 for paratypes). No holotype or catalog number was assigned with these types. Original types are from the East Mountain Shale Member of the Mineral Wells Formation (Desmoinesian) in Palo Pinto County, Texas. The former holotype of *N. metanodosus* (ISGS 61P56 in Merrill, 1975, p. 722, Fig. 1C) is designated here as a paratype specimen. This paratype is from the Exline Member of the Lonsdale Formation (Desmoinesian) in northwestern Illinois.

*Diagnosis*.*—*Outer posterior parapet is not present. The species retains only the carina and inner posterior parapet, differentiating it from *N.* *roundyi* and other morphotypes that possess outer posterior parapets.

*Occurrence*.*—*Stratigraphic range includes the Desmoinesian (Moscovian) and geographic range includes Midcontinent, Appalachians, Texas, and New Mexico of North America, Moscow Basin, and Amazon Basin.

*Description*.*—* Follows original description of Stauffer and Plummer (1932) and supplemental description of Merrill (1972). In oral view, the platform is slightly to moderately bowed and elongate. The platform is sharply pointed posteriorly and is expanded on the inner side but only slightly expanded on the outer side, resulting in an outer margin that is parallel to the carina and an inner margin that diverges from the carina anteriorly. The blade is relatively straight and continues on the platform as the carina. The carina extends to the posterior tip of platform and forms most of outer margin of platform. Some specimens exhibit shelf-like hump on the anterior portion of the outer side. The inner margin of the platform is ornamented by a nodose row extending most of length of the platform, commonly with few gaps posteriorly. Occasionally, the posterior-most nodes fuse to the carina.

In lateral view, the platform is higher than wide. The outer margin is vertical and the inner margin forms a nodose parapet somewhat lower than the carina that forms the outer margin. The highest denticle on the blade is located along the anterior third of the platform.

In aboral view, the entire surface of the platform is excavated and the basal cavity is clearly asymmetric. The outer side is relatively straight and the inner side is expanded. The deepest and widest section of the basal cavity is the anterior third. The basal cavity extends anteriorly as a groove along the oral edge of the blade.

*Etymology*.*—*Latin, *di,* two, and *lat,* line or side; meaning two sides. Overall, name refers to the two rows of nodes on the platform, those that form the carina and the inner posterior parapet.

*Remarks*.*—*The degree of fusion of the inner posterior parapet with the carina is slightly variable, and synonymizing *N.* *dilatus* and *N. metanodosus* incorporates this variation. The number of nodes along the inner parapet is also somewhat variable.