

## Groenlandaspidid Placoderm Fishes from the Late Devonian of North America

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**ABSTRACT.** Two new taxa of groenlandaspidid fish (Placodermi: Arthrodira) from non-marine deposits of the Catskill Formation (Upper Devonian) at Red Hill, Clinton County, Pennsylvania, USA, are the first to be described from North America outside of Greenland. *Groenlandaspis pennsylvanica* n.sp. is known only from isolated trunk elements that are quite similar to *Groenlandaspis antarctica* Ritchie, 1975. *Groenlandaspis pennsylvanica* n.sp. is characterized by distinct features of the median dorsal (MD), posterior dorsolateral (PDL), and anterior dorsolateral (ADL) plates. *Turrispaspis elektor* n.gen. and n.sp. is a smaller form with a high median dorsal plate (MD) and tall, narrow elements of the dorsolateral trunk shield, particularly the PDL, giving this taxon a distinctively short, high trunk shield. The head shield of *Turrispaspis elektor* has a divided pineal plate and the postmarginal plate makes contact with the postorbital plate, excluding the marginal plate from the lateral margin of the head shield. *Groenlandaspis pennsylvanica* n.sp. is a rare faunal component at the Red Hill site whereas *Turrispaspis elektor* is very common. The large sample size of *Turrispaspis elektor* provides a glimpse at ontogenetic and individual variation within this taxon.

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Groenlandaspidid placoderms have been reported from strata as old as Early Devonian, but the diversity is particularly well documented during the Late Devonian. The earliest known member of the family is *Tiaraspis subtilis* from the Early Devonian of Germany (Gross, 1933, 1962; Schultze, 1984). Other groenlandaspidids from the Euramerican Province are *Groenlandaspis mirabilis* from the Famennian of eastern Greenland (Heintz, 1932), and *Groenlandaspis disjectus* from Ireland (Woodward, 1891; Ritchie, 1975). Gross (1965) discusses isolated groenlandaspidid median dorsal elements from the Famennian of

Belgium. The Gondwanan Province has produced *Groenlandaspis theroni* from the Givetian of South Africa (Chaloner *et al.*, 1980; Anderson *et al.*, 1999), *Groenlandaspis antarctica* and *Boomeraspis goujeti* from the late Givetian to early Frasnian Aztec Siltstone in Victoria Land, Antarctica (Ritchie, 1975; Long, 1995), *Groenlandaspis seni* from the ?Frasnian of Turkey (Janvier & Ritchie, 1977), and *Groenlandaspis riniensis* and *Africanaspis doryssa* from the Famennian of South Africa (Long *et al.*, 1997). Janvier & Ritchie (1977, fig. 1E) and Blicek *et al.* (1980) discuss groenlandaspidid material from the Eifelian of Iran. Janvier

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