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Givetian (Middle Devonian) sharks from Cairo, New York (USA): Evidence of early cosmopolitanism

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Whereas cosmopolitan distribution patterns are established for many Late Devonian vertebrates (e.g., placoderms, onychodontiforms), few palaeobiogeographic studies have considered chondrichthyans. Recent discoveries of shark material demonstrate that some chondrichthyans were cosmopolitan by the Middle Devonian. Abundant Givetian microremains have been recovered from the Cairo quarry in eastern New York State, USA. These include teeth of two shark species with Gondwanan affinities, the omalodontid *Portalodus mannoliniae* sp. nov. and the antarctilamnid *Wellerodus priscus*. Abundant teeth of *P. mannoliniae* sp. nov. are characterized by a smooth diplodont crown, polarized cusps, and a labially oriented base. The teeth demonstrate monognathic heterodonty. The juvenile morph is distinguished from the adult by smaller size, slender cusps, and variation in the shape of the base. *W. priscus* is represented by rare juvenile teeth. Two groups of scales that show affinity to material from northern (Spain) and East Gondwana (Antarctica) are tentatively attributed to the two described species. Antarctilamnid distribution suggests a north Gondwanan origin and a colonization of the margin of the landmass before dispersing to Laurentia by the Middle Devonian. This material further indicates that vertebrate global dispersal was initiated by the Middle Devonian, and emphasizes earlier palaeogeographic interpretations that the Middle Devonian "Hamilton fauna" of North American Laurussia originated in the Early Devonian in South American Gondwana.

Key words: Chondrichthyes, Elasmobranchii, Antarctilamnidae, Omalodontiformes, taxonomy, ontogeny, palaeobiogeography, Devonian, North America.

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