

NEW INFORMATION ON THE PECTORAL FIN IN PLACODERMI FROM THE LATE DEVONIAN CLEVELAND SHALE FAUNA (FRASNIAN OF NORTHERN OHIO)

Gary L. Jackson, Cleveland Museum of Natural History
Robert K. Carr, Dept. Biological Sciences, Ohio University

Placoderms have been characterized as either obligate benthic organisms or that they were limited to life just off the bottom. These interpretations are a consequence of our lack of understanding of the locomotor structures in these fishes. Preservation in most taxa is limited to perichondrally ossified pectoral girdle and basal fin elements. An exception to this pattern is the ray-like rhenanid, *Gemuendina*, with a pectoral fin consisting of a single proximal element with up to three rows of radials. Other than this rare example, little is known of the fin distal to the proximal basals.

Four placoderm specimens from the Cleveland Shale provide new information on the pectoral fin. A large *Dunkleosteus terrelli* specimen documents the first recognized occurrence of radials among the arthrodires. A second specimen of *D. terrelli* possesses numerous basals with a carbon film representing the distal fin (no ossified radials are seen in this specimen suggesting radial ossification may represent an age-related phenomenon). Two specimens of unidentified selenosoteid arthrodires also demonstrate the presence of organic films. The importance of these specimens is the information they provide on estimates for the aspect ratio of the pectoral fin. In comparison to the chondrichthyan *Cladoselache* (a recognized active swimmer in the pelagic realm), the pectoral fin in arthrodires appears to have a comparable aspect ratio (standardized for size and thus suggesting equivalent lift capabilities). In the arthrodire *Heintzichthys*, the presence of potential muscle attachments on the basal elements suggests the possibility of active fin retraction or alteration of fin camber further adding to controlled maneuverability.

A proposed explanation for the extinction of placoderms is thought to be through the process of competitive displacement by the contemporaneous chondrichthyans and osteichthyans. This has been related, in part, to relative differences in effective locomotion (based on incomplete evidence among placoderms). The recognition of comparable locomotor structures in arthrodires and sharks of the Late Devonian necessitates our reevaluation of placoderm extinction at the close of the Devonian.