

A new cheirolepidid fish from the Middle-Upper Devonian of Red Hill, Nevada, USA

Gloria ARRATIA & Richard CLOUTIER

Abstract

A new species of *Cheirolepis* is described from the Middle-Upper Devonian of Nevada, USA. Comparisons with *Cheirolepis trailli* and *C. canadensis* show that the new species is characterized by a unique combination of characters, e.g., a small orbit, a short spiracular slit, a very elongate and narrow dermosphenotic, a long sutural connection between dermosphenotic and supratemporal, and cranial ornamentation including numerous ganoine ridges and few, small tubercles. A pineal foramen is absent, as are the intertemporal and quadratojugal bones. A series of small pores confirm the presence of a jugal pit line; however, a continuation of the jugal pit line and the infraorbital canal has not been observed. The new material enriches the available information on the morphology of *Cheirolepis*, particularly on the palatoquadrate region and the pectoral girdle, and reveals that there is variation in the cranial morphology of the species of *Cheirolepis* that cannot be ignored, e.g., the relationship of the dermosphenotic with other bones, and the presence of notch(es) in the nasal bone and preorbital bone. The structure of the rostral region of *Cheirolepis* still remains unclear due to incomplete preservation.

Introduction

Among Middle-Late Devonian actinopterygians, the family Cheirolepididae is currently known from only one genus and four species: *Cheirolepis canadensis* WHITEAVES, 1881 (middle Frasnian; Upper Devonian; Miguasha, Canada), *C. trailli* AGASSIZ, 1835 (Eifelian-Givetian, Middle Devonian; Scotland), *C. gaugeri* GROSS, 1973 (Givetian; Germany and Belarus), and *C. gracilis* GROSS 1973, (Givetian; Germany and Belarus). [In addition, *Cheirolepis sinualis* KARATAJŪTE-TALIMAA, in litt. has been reported by MARK-KURIK (2000) from the Eifelian of Belarus.] Mention of *Cheirolepis* sp. are also listed by BLIECK & CLOUTIER (2000) from the Emsian of the East Baltic area and by MARK-KURIK (2000) from the Eifelian-Givetian of Latvia and Estonia. *C. canadensis* (see ARRATIA & CLOUTIER 1996) and *C. trailli* (see PEARSON & WESTOLL 1979) are well known from numerous, complete or almost complete specimens. However, the validity of *C. gaugeri* and *C. gracilis* from Germany, based on scale material from the Middle Devonian (GROSS 1973), was questioned by PEARSON & WESTOLL (1979). Nevertheless, these two species have recently been reported as ichthyoliths from Belarus by MARK-KURIK (2000).

Cheirolepidid-type scales (the so-called acanthodian-like squamation) have been recovered in Europe, including Scotland, Germany, Latvia, Estonia and Belarus, but these scales are absent from northern France and Belgium (DERYCKE et al. 1995). The presence of another species of cheirolepidid outside Europe, *C. canadensis*, was first reported by WHITEAVES (1881) from the Upper Devonian of the Escuminac Formation, Quebec, eastern Canada. Several years ago, REED (1992) reported the presence of *Cheirolepis* cf. *C. canadensis* from the Middle-Upper Devonian boundary of Red Hill, Nevada, USA. REED's (1992) material included disarticulated bones (e.g., lower jaw, fragments of rays; Fig. 1) and scales. Based on the ornamentation of the dermal bones and the morphology of the scale crowns, REED concluded that the material from Nevada strongly resembles *C. canadensis* and identified it as *Cheirolepis* cf. *C. canadensis*. This identification was also corroborated by additional faunal similarities between the Denay Limestone at Red

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