Journal of The Palaeontological Society of India
Vol. 47, 2002, pp. 151-155

MIDDLE TRIASSIC FISH TEETH FROM THE KALAPANI LIMESTONE OF MALLA JOHAR, CHAMOLI DISTRICT (UTTARANCHAL)

N. L. CHHABRA and **V. P. MISHRA***

GEOLOGY DEPARTMENT, UNIVERSITY OF LUCKNOW, LUCKNOW – 226007, INDIA
*PALAEONTOLOGY DIVISION, GEOLOGICAL SURVEY OF INDIA, LUCKNOW – 226024, INDIA

ABSTRACT

A rich collection of fish remains was recovered from the Kalapani Limestone (Late Scythian–Early Carnian) of the Malla Johar area in district Chamoli (Uttaranchal). Fish teeth belonging to *Polyacrodus*, *Hybodus* and *Saurichthys* are described here.

Key words: Fish teeth, Middle Triassic, Malla Johar (Uttaranchal).

INTRODUCTION

This note records a large number of fish remains which were recovered during the examination of the macerated fractions of the samples collected from the Malla Johar area in Chamoli district (Uttaranchal). The samples were collected by Prof. S. Kumar of Geology Department of University of Lucknow during the expeditions to the Malla Johar area in 1982 and 1986. The samples were macerated by one of us (NLC) for conodont biostratigraphy (Chhabra and Kumar 1984, 1992). The samples were collected from a place about 7.4 km from Sumna-Rimkhimmule track in Yong Valley, Malla Johar (fig.1). The fish teeth were recovered, from the samples yielding age-diagnostic conodont assemblages (Chhabra and Mishra, 1999).

GEOLOGY OF THE AREA

The samples were collected from the Kalapani Limestone exposed in Yong Valley of the Malla Johar area in Chamoli district (Uttaranchal). The Formation, which is essentially calcareous, is characterised by nodular bedding and is about 31 m thick. In Yong Valley, the Kalapani Limestone overlies unconformably the Kuling Formation and is underlain by the Kuti Formation of Norian age with a sharp contact (fig. 2). Chhabra and Kumar (1992) have established the conodont biostratigraphy of the Kalapani Limestone in addition to correlating it both regionally and intercontinentally and recorded nine distinctive assemblages.

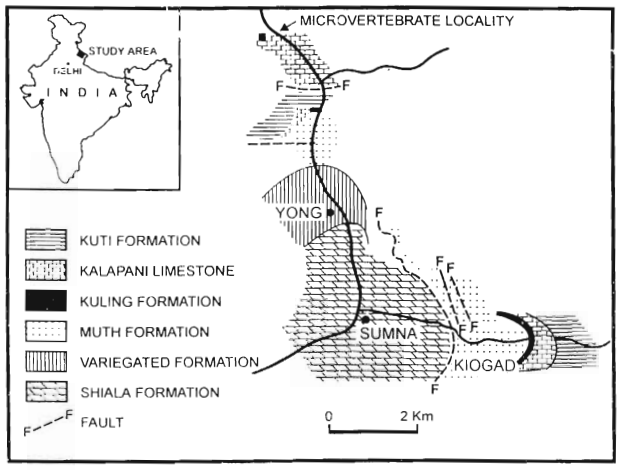


Fig. 1. Geological map of Yong Valley, Malla Johar showing microvertebrate locality (after Chhabra and Mishra, 1999).

MATERIAL AND METHODS

The samples were kept dipped in acetic acid solution (10% strength) for about 15 days. The samples were stirred periodically to allow the action of the acid on the samples. The samples were then clean washed and the fractions were collected over the sieves of assorted sizes. The macerated material was dried and the macerated fractions were thoroughly examined under binocular microscope. While examining the fractions for conodonts, fish remains were also encountered which were isolated and studied in detail. The fish remains were collected from the sample nos. KP.1 to KP.5 (Carnian), KP.6 to KP.13 (Ladinian) and KP.14 to KP.21 (Anisian). Since the samples were macerated in acetic acid to

separate out mainly conodonts, several of the fish specimens recovered are etched, at times moderate to heavily obliterating the details of the specimens.

The details of some of the teeth are described herein. The slides are in the repository of the Geology Department, University of Lucknow, Lucknow.

SYSTEMATIC PALAEONTOLOGY

Class **Chondrichthyes** Huxley, 1880

Subclass **Elasmobranchii** Bonaparte, 1838

Infraclass **Euselachii** Hay, 1902

Order **Hybodontiformes** Patterson, 1966

Superfamily **Hybodontoidea** Zangerl, 1981

Family **Polyacrodontidae** Glikman, 1964

Genus ***Polyacrodus*** Jaekel, 1889

Polyacrodus sp.

(Plate I, fig. 1)

Material: One isolated tooth (LUVP/TR/1001) from sample no. KP.6.

Description: The species is represented by a single tooth, which is slightly broken from one end (anterior). The tooth is broader than high; principal cusp somewhat pyramidal but obtuse apically and broad. The heel is well developed with two pairs of lateral cusplets (one cusplet broken). Cusplets are triangular. Labial and lingual sides are slightly convex. Widely spaced, longitudinal ridges are seen on the surface of principal cusp and lateral cusplets. Root, though broken, was probably not very thick.

Remarks: The tooth closely resembles *Polyacrodus* sp. illustrated and described by Kriwet, Rauhut and Gloy (1997). The authors are not aware of any earlier record of a tooth of *Polyacrodus* from the Himalaya, though its scales have been recorded from the Triassic of Kumaun (Misra, Sahni and Chhabra, 1973; Mehrotra, Dass and Sahgal 1983) and from Kashmir (Srivastava and Mehrotra, 1986).

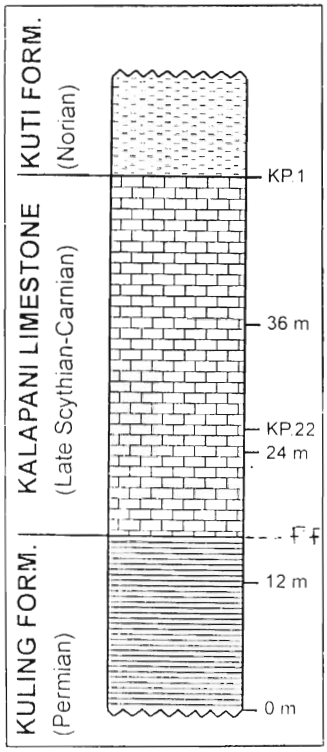


Fig. 2. Litholog of the Kalapani Limestone exposed in the study area.

Family **Hybodontidae** Owen, 1846

Subfamily **Hybodontinae** Maisey, 1989

Genus ***Hybodus*** Agassiz, 1837

Hybodus plicatilis Agassiz, 1843

(Pl. I, fig. 2)

Material: One isolated tooth (LUVP/TR/1002) from sample no. KP.21.

Description: The species is represented by a single tooth, which is broken on its anterior side. It has one principal and three lateral cusplets. Cusplets of posterior side only preserved. The tooth was very broad than high. The apex of the principal cusp is rounded probably due to its use. The cusplet nearer to the main cusp is distinct, larger than the other two

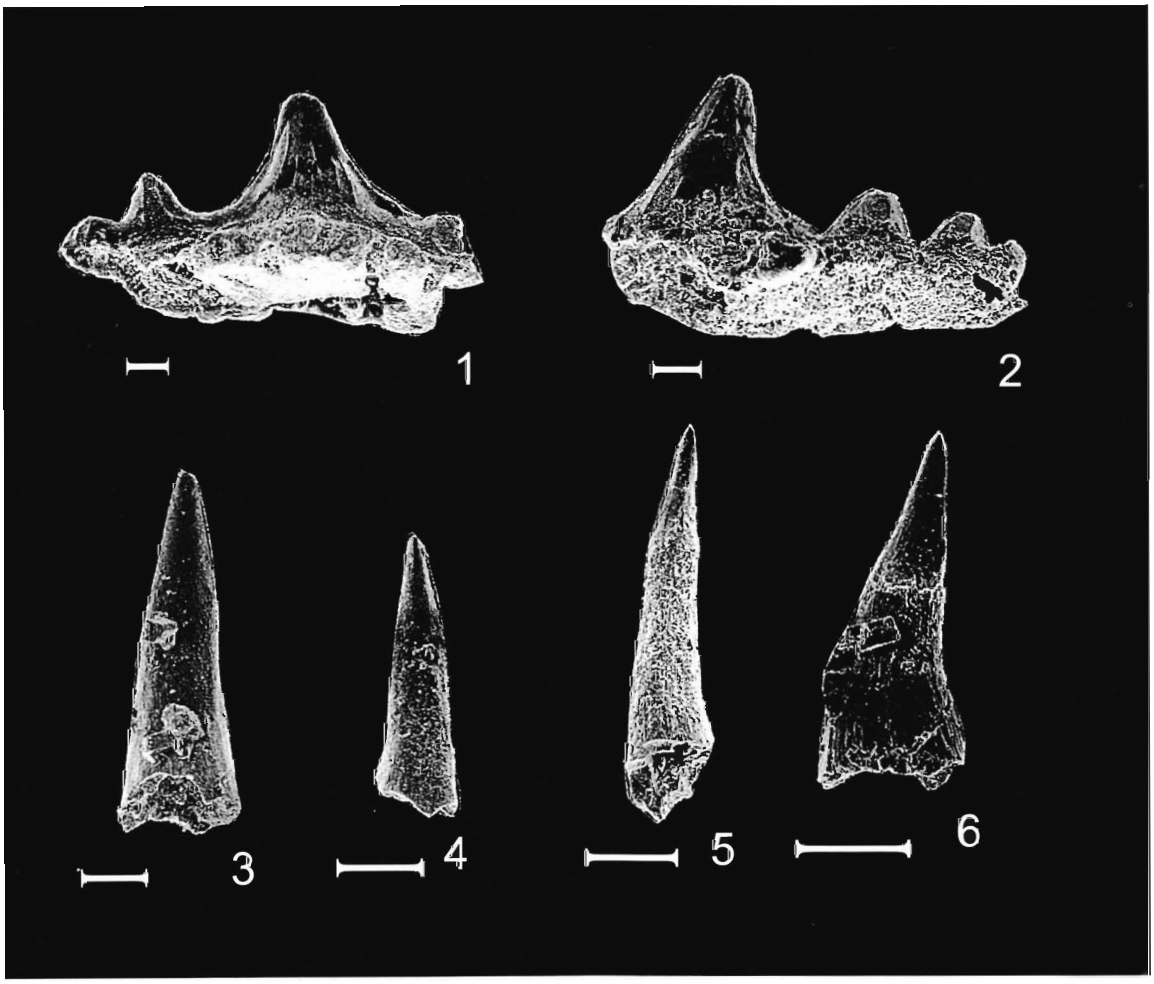
EXPLANATION OF PLATE I

(Scale bar given on lower left corner of each photograph is equal to 100 μ micron)

1. ***Polyacrodus*** sp. KP.6, LUVP/TR 1001.
2. ***Hybodus plicatilis*** Agassiz, KP.21, LUVP/TR 1002.
3. ***Saurichthys apicalis*** Agassiz, KP.16, LUVP/TR 1016.
4. ***Saurichthys apicalis*** Agassiz, KP.16, LUVP/TR 1017.
5. ***Saurichthys accuminatus*** Agassiz, KP.16, LUVP/TR 1018.
6. ***Saurichthys acuminatus*** Agassiz, KP.16, LUVP/TR 1019.

Journal of The Palaeontological Society of India
Vol. 47, 2002

Plate I



cusplets, which seem to be jointed together. The effect of etching by acetic acid is seen on the surface of the main cusp and cusplets but no distinct striations are visible. The root is broken.

Remarks: The teeth of several species are common in the Triassic of Himalaya (Mehrotra and Mishra, 1996).

Class **Osteichthyes** Huxley, 1880

Subclass **Actinopterygii** Klein, 1885

Infraclass **Chondrostei** Agassiz, 1843

Order **Acipenceriformes** Agassiz, 1843

Family **Saurichthidae** Goodrich,1909

Genus ***Saurichthys*** Agassiz, 1834

Saurichthys apicalis Agassiz, 1834

(Pl. I, figs. 3-4)

Material: Several isolated teeth from sample nos. KP.2, KP.16 and KP.21. LUVP/TR/1016 and 1017 from sample no. KP.16 are figured here.

Description: The teeth are small to medium size showing variability in their dimensions. The teeth are erect, conical with acute apices. The enamel in the apical part of the crown is of lighter shade than in the rest part of the tooth. The striations, if any on the tooth, are not visible may be due to effect of the acetic acid. Broken basal part of the tooth shows near circular opening of the pulp cavity.

Remarks: The species has been recorded earlier from Triassic of Kashmir and Kumaun (Sahni and Chhabra, 1976; Mehrotra, Sahgal and Jangpangi, 1983; Srivastava and Mehrotra, 1986).

Saurichthys acuminatus Agassiz

(Pl. I, figs. 5-6)

Material: Several isolated teeth from sample nos. KP.2, KP.16 and KP.21. LUVP/TR/1018 and 1019 from sample no. KP.16 are figured here.

Description : The teeth are erect, elongated with tapering acuminate apex. Fine ribs like longitudinal striations are seen on the surface of the tooth, which do not reach up to the apical portion. A slight depression is visible on the margins of tooth separating the base from the crown.

Remarks: The species has been recorded earlier from Triassic of Kashmir and Kumaun (Sahni and Chhabra, 1976; Mehrotra, *et al.*, 1983; Srivastava and Mehrotra, 1986).

DISCUSSION

In the Uttaranchal Himalaya, the Triassic fishes are known from the Kumaun region only, viz. Middle Triassic of Niti Pass (Misra, Sahni and Chhabra, 1973), Middle Triassic of Niti Pass and Malla Johar (Sahni and Chhabra, 1976), Early Triassic of Shalshal (Mehrotra, *et al.*, 1983) and Early Triassic of Kuti and Middle Triassic of Kalapani (Mehrotra, Dass and Sehgal, 1983). Mehrotra and Mishra (1996), while synthesising the Pre-Tertiary Ichthyofauna of the Northwest Himalaya, gave the list of Triassic fishes known from the U.P. Himalaya (now Uttaranchal Himalaya).

Polyacrodus is known from the Triassic of Kashmir and Kumaun Himalaya by placoid scales only. Mehrotra, Dass and Sahgal (1983) recorded it from the Kuti area (Kumaun), while Srivastava and Mehrotra (1986) recorded the from Khreuh and Pastannah areas of Kashmir. *Polyacrodus* is known from the Triassic of several European countries.

Saurichthys is known from the Triassic of Kashmir, Kumaun and Himachal Pradesh Himalaya in India and Early Triassic of Nepal and Salt Range (Mishra, Mehrotra, Pande and Ali, 1990). It has also been recorded from the Early-Middle Triassic of Pranhita-Godavari Valley of south India. In fact, it had worldwide distribution during the Triassic.

Hybodus (Leiacanthus) is a common element in the Middle Triassic of the Kashmir and Kumaun Himalaya in India. The genus had a widespread distribution during the Triassic in Europe and range up to Maastrichtian, being recorded from North America, parts of Europe and China. In India, the genus is not known from the post-Triassic sediments.

ACKNOWLEDGEMENTS

Authors are grateful to Prof. I. B. Singh, Head of the Geology Department, University of Lucknow, Dr. S. Mehra, Director, Palaeontology division, Northern Region, G.S.I. Lucknow for providing and laboratory facilities and Prof. S. Kumar, Geology

Department, University of Lucknow, Lucknow for providing the samples for this study.

REFERENCES

Chhabra , N.L. and Kumar, S. 1984. Record of Carnian conodonts from the top of Kalapani Limestone, Kumaun Himalaya, India, *Jour. Pal.. Soc. India*, **29** : 88-92.

Chhabra , N.L. and Kumar, S. 1992. Late Scythian through early Carnian conodont assemblages and their biostratigraphic importance from off shore carbonates of Nothern Kumaun, Tethys Himalaya, India. *Revue de Micropal.* **35** (1) : 3-21.

Chhabra, N.L. and Mishra, V.P. 1999. Microvertebrate fauna from the Kalapani Limestone (Late Scythian-Early Carnian), Northern Kumaun, Tethys Himalaya. *Biol. Mem.* **25** : 84-89.

Kriwet, J., Rauhut, O. W. M. and Gloy, U. 1997. Microvertebrate remains (Pisces, Archosauria) from the Middle Jurassic (Bathonian) of southern France. *N. Jb. Geol. Palaont. Abh.* **206** (1) : 1-28.

Mehrotra, D.K., Dass, S. and Sehgal, A. 1983. Occurrence of fish microremains from the Kuti and Kalapani area, Kumaon Himalaya, Uttar Pradesh. *Geosci. Jour.* **IV** (2): 205-206.

Mehrotra, D.K. and Mishra, V.P. 1996. Pre-Tertiary Ichthyofauna from Northwest Himalaya. *Geol. Surv. India, Spl. Publ.* **21** (1) : 281-283.

Mehrotra, D.K., Sahgal, A. and Jangpangi, B.S. 1983. On some Early Triassic fish microremains from the Shalshal area of Kumaun Himalaya, Uttar Pradesh. *Himal. Geol.* **11** : 433-437.

Mishra, V.P., Mehrotra, D.K., Pande, A.C. and Ali, M.A. 1990. A teleostean fish from the Lower Triassic of Chamba, Himachal Pradesh. *Jour. Pal.. Soc. India*, **35** : 73-76.

Misra, R.C., Sahni, A. and Chhabra, N.L. 1973. Triassic conodonts and fish remains from Niti Pass, Kumaun Himalaya. *Himal. Geol.* **3** : 148-161.

Sahni, A. and Chhabra, N.L. 1976. Microfish remains from certain Triassic sections in the Kashmir and Kumaun Himalayas. *Proc. Ind. Colloq. Micropal. Strat.* **VI** : 218-224.

Srivastava, J.P. and Mehrotra, D.K. 1986. Microfish remains from the Triassic of Kashmir Himalaya. *Rec. Geol. Surv. India,* **113** (8) : 91-100.

Manuscript Accepted August 2002