

First record of *Auroradiolites biconvexus* from the platformal carbonate of Khalsi Formation (Cretaceous), ITSZ, Ladakh Himalaya, India

Prasenjit Barman, Shruti Ranjan Mishra, Alok Chandra Pande

Himalayan Geology Division, Geological Survey of India, NR Lucknow

Worldwide, the Cretaceous carbonate platforms are considered to preserve some of the largest and most widespread sedimentary units in the geologic column (Simo et al. 1993). These platforms flourished during the Cretaceous Period in the Tethyan ocean (Schlager and Philip, 1990). These platforms provide important information about habitat and evolution of fauna, depositional environment, diagenetic processes and most importantly the climate change. In the Indus–Tsangpo Suture Zone (ITSZ), platformal carbonate crop out as Khalsi limestone of Khalsi Formation on the right as well as left bank of the Indus river in the vicinity of Khalsi village. The limestone abundantly preserves a large variety of fauna and flora namely, rudists, corals, orbitolinids, gastropods and algae, however, many of these species are unidentified till date. The age of Khalsi Formation is considered Aptian-Cenomanian based on *Orbitolina* (Tewari et al., 1970; Srikantia and Bhargava 1978; Bassoullet *et al.*, 1982; Van Haver 1984; Van Haver *et al.*, 1984; Mathur and Vogel 1988).

Near to Khalsi, a large number of rudist specimens has been recorded from Khalsi limestone during field season 2018-19 (Khalsi-Leh Expedition 2018). Though, the identification of the specimens is under progress, one specimen (Fig 1a and 1b) has been identified as *Auroradiolites biconvexus* (Family RADIOLITIDAE d'Orbigny, 1847) by Xin Rao (a renowned expert on rudists from Nanjing Institute of Geology & Palaeontology, Chinese Academy of Sciences, China). The *A. biconvexus* has been reported earlier from Lhasa block (Tibet) and Kandahar Basin of Afganistan only (Rao *et al.*, 2015 and 2017). The *A. biconvexus* is being reported for the first time from Khalsi Formation, Ladakh Himalaya.

The presence of rudists from the Ladakh area was reported by Parona in early 1928. Later, Mathur and Vogel (1988) described systematics of some rudists i.e. *Auroradiolites* (*Eoradiolites*) *gilgitensis* Douvillé, *Horiopleura* sp. and cf. *Toucasina* sp. from Khalsi limestone, 2.5 km east of Khalsi for the first time.

This finding will be a supportive tool for the establishment and reconstruction of the paleogeographic connection between Afganistan, Tibet and India. The collaborative work with Dr. Xin Rao (with the permission of competent authority, i.e. Dy. D. G., IA and IGC, GSI, CHQ-Kolkata) is under progress.



Fig. 1a -: Well preserved *Auroradiolites biconvexus*, Khalsi Formation. Scale bar 1cm.

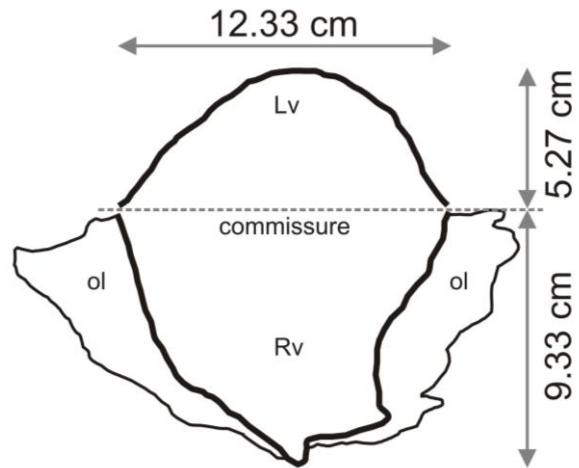


Fig. 1b -: Outline sketch of *Auroradiolites biconvexus*, Khalsi Formation. Lv= left valve, Rv= right valve, ol= outer shale layer

References:

- Bassoullet, J. P., Colchen, M., Juteau T., Marcoux J., Mascle G. and Reibel G. 1982. Geological studies in the Indus suture zone of Ladakh (Himalayas), *In* "Contributions to Himalayan Geology" (V.J. Gupta ed.), *Hindustan Publishing Corporation*, Delhi, 2, pp. 96-124.
- Mathur, N. S. and Vogel, K. 1988. Some rudists from Khalsi limestone of Indus Formation, Ladakh Himalaya, *Géobios*, 21, pp. 693-707.
- Parona, C. F. 1928. Fauna cretacee del Caracorùm e degli altipiani tibetani: Result, *Geol. Geogr. Spediz. Ital. De Fillippi*, (Zanichelli, ed.), Bologna, 1913-14, 6: pp. 113-147.
- Rao, X., Skelton, P. W., Sano, S. -I., Li, C., Pan, Y., Luo, H., Cai, H., Peng, B and Sha, J. 2017. Evolution and Palaeogeographical dispersion of the Radiolitid rudist genus *Auroradiolites* (Bivalvia, Hippuritida) with descriptions of new material from Tibet and archived specimens from Afghanistan. *Papers in Palaeontology*, 3(2), pp. 297-315.
- Rao, X., Skelton, P. W., Sha, J., Cai, H. and Iba, Y. 2015. Mid Cretaceous rudists (Bivalvia: Hippuritida) from the Langshan Formation, Lhasa block, *Papers in Palaeontology*, 1(4), pp. 401-424.
- Schlager, W. and Philip, J. 1990. Cretaceous carbonate platforms, *In*: R.N. Ginsburg and B. Beaudoin (Editors), *Cretaceous Resources, Events and Rhythms*, *NATO ASC Ser.*, 304, pp. 173-195.
- Simo, J. A. T., Scott, R. W. and Masse, J.-P. 1993. Cretaceous carbonate platforms: an overview, *In*: *Cretaceous carbonate platforms* (Eds J. A. T. Simo, R. W. Scott, and J.-P. Masse.) *AAPG Mem.*, 56, pp. 1-14.
- Srikantia S. V. and Bhargava O. N. 1978. The Indus tectonic belt of Ladakh Himalaya - its geology, significance and evolution, *In* "Current Trends in Geology: Tectonic Geology of the Himalaya", (P.S. SA~LANI, ed.), *Today and Tomorrows publishers*, New Delhi, 1, pp. 43-62.

- Tewari, B. S., Pande, I.C. and Kumar R. 1970. Lower Cretaceous fossiliferous limestone from Khalsi, Ladakh, *Publ. Centre of Advanced Study in Geology, Chandigarh (Panjab Univ.)*, 7, pp. 197-200.
- Van Haver, T. 1984. Etude stratigraphique, sédimentologique et structural d'un bassin d'avant arc: exemple du bassin de l'Indus, Ladakh, Himalaya, Thèse Université Grenoble, France, 204p.
- Van Haver, T., Bassoullet, J., Blondeau, A. and Mascle G. 1984. Les séries détritiques du bassin de l'Indus au Ladakh: nouvelles données stratigraphiques et structurales, *Riv. It. Paleont. Strat.*, Luglio, 9 (1), pp. 87-102.