

NEWS AND NOTES

A Preliminary Report of Microfossils (Foraminiferida) from the Jurassic Sediments of Jajiya Member, Jaisalmer Formation, Western Rajasthan – A. Talib, Gagnesh Upadhyay and M. Haseen, Department of Geology, Aligarh Muslim University, Aligarh; Email: talib04@gmail.com

In Peninsular India marine Jurassic rocks are well developed in Kutch and Jaisalmer regions. Although there are numerous reports of microfossils particularly foraminifera from the Jurassic rocks of Kutch, only a few foraminiferal studies are available from the Jurassic rocks of Jaisalmer region (Subbotina et al. 1960; Garg and Singh, 1983; Kalia and Chowdhury, 1983; Dave and Chatterjee, 1996). This may be due to the fact that the exposures of Jurassic rocks in Jaisalmer area are not as thick and well exposed as in the Kutch region and are mostly buried under sand dunes. However, a detailed study of microfossils especially foraminifera of these sediments may facilitate in interpreting the biostratigraphy, depositional environment, and palaeogeography of these rocks which in turn will provide valuable data for exploration of hydrocarbons in this region. In view of this, a detailed study of the Jurassic rocks of Jaisalmer area is undertaken by us and the present report gives a preliminary account of the foraminifera recovered for the first time from Jajiya Member of the Jaisalmer Formation.

Jurassic rocks of the Jaisalmer Basin in western Rajasthan are divided into Lathi, Jaisalmer, Baisakhi and Bhadasar formations in ascending order (Dasgupta, 1975). Of these, Jaisalmer Formation exhibits thickest development of Jurassic sediments reaching up to 400m and is the most fossiliferous Jurassic formation in the region. Jaisalmer Formation is subdivided into five members, viz., Hamira, Joyan, Fort, Badabag and Kuldhara (Dasgupta, 1975) to which another member, viz., Jajiya Member is added later on (Kachhara and Jodhawat, 1981). Foraminifers are reported from Fort, Kuldhara and Badabag members only. Most of these foraminiferal assemblages are rather poor, composed of a few species except for the Kuldhara Member. The present foraminiferal assemblage is recovered from

a well exposed outcrop of Jajiya Member near Jajiya village located about 5 km southwest of Kuldhara village (N 26° 50' 28.4" : E 70° 44' 31.6"), about 22 km southwest of Jaisalmer town. The outcrop exposes a 13 m thick sequence divided into three lithounits from bottom to top, viz., Jj-I, Jj-II, and Jj-III. The basal Lithounit Jj-I consists of 4.75 m thick light grey shales with intercalations of several alternating beds of purple coloured sandstone. This is followed by 6 m thick buff coloured oolitic limestone (Lithounit Jj-II) which is cross-bedded and having mega-ripples. The last Lithounit Jj-III consists of yellow coloured fossiliferous sandy limestone 1.5m thick and having megafossils, mainly brachiopods. Twenty-one samples were collected from the entire sequence. However, samples of Lithounit Jj-I and Jj-II were found to be barren and only samples of Lithounit Jj-III yielded foraminifera.

The Jajiya foraminiferal assemblage comprises twenty-three foraminiferal species obtained from six samples (Fig. 1). The assemblage belongs to three suborders, viz., Lagenina having eight genera and nineteen species (83%), Textulariina

represented by two genera and three species (13%), and Globuligerina having one species belonging to one genus (4%). The foraminiferal assemblage is dominated by the family Vaginulinidae which comprises sixteen species belonging to five genera, covering 70% of the total species. Other families are Nodosariidae having three species belonging to three genera, Hormosinidae having two species belonging to a single genus, and Lituolidae and Globuligerinidae with one species each.

As most of the species are long-ranging, they are not very useful for dating these sediments. Furthermore, epistominids which are considered as markers for dating Jurassic rocks are also missing from the present assemblage. However, four species of the present assemblage, viz., *Citharina* aff. *C. entypomatus*, *Vaginulina* aff. *V. compsa*, *V. formosula*, and *Globuligerina oxfordiana* have been reported from Oxfordian strata of different parts of the world (Loeblich and Tappan, 1950; Grigyalis, 1958; Kalantari, 1969) and on this basis Oxfordian age may be assigned to the studied sediments.

The dominance of vaginulinids in the

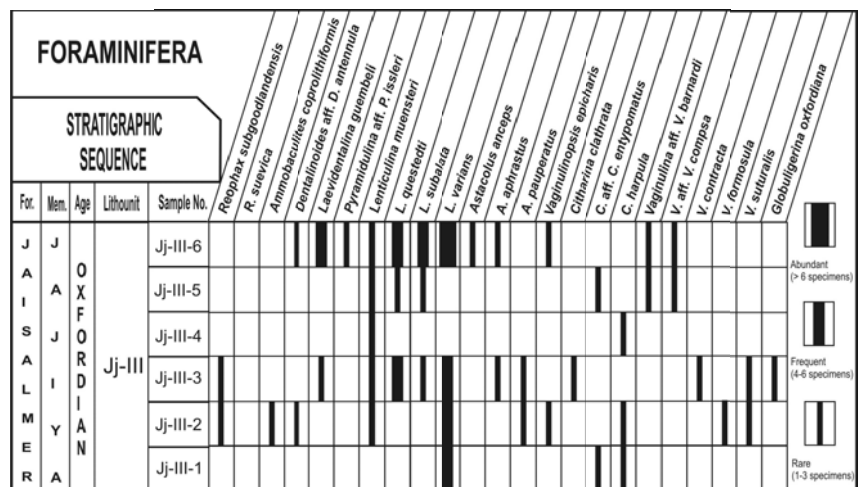


Fig.1. Frequency distribution of foraminifera per 10 gm of sample in Jajiya Member, Jaisalmer Formation, Rajasthan.

present foraminiferal assemblage suggests shallow water, open marine environment, most probably the deeper parts of the shelf. The presence of overwhelming majority of hyaline foraminifers in the present assemblage indicates normal salinity which is also supported by high Fisher index value of >5 (Murray, 1991). Higher alpha index (>5) also supports well aerated environment which is also indicated by the dominance of infaunal genera such as *Lenticulina*, *Astacolus*, *Citharina* and *Vaginulina*, *Vaginulina* being the most abundant genus in the present assemblage. Normal oxygen values are also indicated by the presence of a large majority of unornamented tests of flattened genera like *Astacolus* and *Vaginulina* (Bernhard, 1986). The present foraminiferal assemblage is characterized by the dominance of morphogroups J2 of Reolid et al. (2008). This morphogroup consists of flattened forms with shallow infaunal microhabitat and active deposit feeder and grazing omnivore trophic behaviour and constitute 52% of the observed assemblage. Representative genera of this group which are present in the Jajiya assemblage are *Astacolus*, *Vaginulinopsis*, *Citharina*, and *Vaginulina*. Unornamented species of these genera indicate normal oxygen values (Reolid et al. 2008). In view of the above, it may be interpreted that the assemblage recovered from the Jajiya Member of the Jaisalmer

Formation represents a shallow, open marine environment having normal salinity and well-oxygenated waters.

Detailed investigations on Jajiya foraminiferal assemblage are in progress and a comprehensive account of taxonomy, biostratigraphy, palaeoecology and palaeobiogeography, etc., will be communicated later.

Acknowledgements: We are grateful to the Chairman, Department of Geology, A.M.U., Aligarh for providing various facilities. Financial assistance for this work was provided by the U.G.C., New Delhi, through Major Research Project.

References

- BERNHARD, J.M. (1986) Characteristic assemblages and morphologies for anoxic organic rich deposits: Jurassic through Holocene. *Jour. Foraminifer. Res.*, v.16, pp.207-215.
- DASGUPTA, S.K. (1975) A revision of the Mesozoic-Tertiary stratigraphy of the Jaisalmer basin, Rajasthan, India. *Indian Jour. Earth Sci.*, v.2, pp.77-94.
- DAVE, A. and CHATTERJEE, T.K. (1996) Integrated foraminiferal and ammonoid biostratigraphy of Jurassic sediments in Jaisalmer basin, Rajasthan. *Jour. Geol. Soc. India*, v.47, pp.477-490.
- GARG, R. and SINGH, S.N. (1983) Distinctive Bathonian agglutinated foraminifera from Jaisalmer, Western Rajasthan, India. *Jour. Palaeontol. Soc. India*, v.28, pp.118-133.
- GRIGYALIS, A.A. (1958) *Globigerina oxfordiana* sp. n. – nakhodka Globigerin v Verkhnelyurskikh otlozheniyakh Litvy. *Nauchnye Doklady Vysshey Shkoly, Geologo-Geograficheskie Nauki*, v.3, pp.109-111.
- KACHHARA, R.P. and JODHAWAT, R.L. (1981) On the age of the Jaisalmer Formation, Rajasthan, India. *Proc. IX Indian Colloq. Micropalaeontol. and Stratigr.*, pp.235-247.
- KALANTARI, A. (1969) Foraminifera from the Middle Jurassic-Cretaceous succession of Koppet-Dagh region (N.E. Iran). *Nat. Iranian Oil Co., Geol. Lab., Publ. 3*, 298p.
- KALIA, P. and CHOWDHURY, S. (1983) Foraminiferal biostratigraphy, biogeography, and environment of the Callovian sequence, Rajasthan, Northwestern India. *Micropaleontol.*, v.29, pp. 223-254.
- LOEBLICH, A.R. and TAPPAN, H. (1950) North American Jurassic foraminifera. I: The type Red Water Shale (Oxfordian) of South Dakota. *Jour. Paleontol.*, v.24, pp.39-60.
- MURRAY, J.W. (1991) Ecology and palaeoecology of benthic foraminifera. Longman, New York, 397p.
- REOLID, M., RODRIGUEZ-TOVAR, NAGY, J. and OLORIZ, F. (2008) Benthic foraminiferal morphogroups of mid to outer shelf environments of the Late Jurassic (Prebetic Zone, southern Spain): Characterization of biofacies and environmental significance. *Palaeogeogr. Palaeoclimatol. Palaeoecol.*, v.261, pp.280-299.
- SUBBOTINA, N.N., DUTTA, A.K. and SRIVASTAVA, B.N. (1960) Foraminifera from the Upper Jurassic deposits of Rajasthan (Jaisalmer) and Kutch, India. *Bull. Geol. Min. Met. Soc. India*, v.23, pp.1-48.

BPR - Reminiscences

The Geological Society is planning on bringing out a booklet of tributes and personal reminiscences of colleagues, fellows and friends of BPR. We welcome a brief note (not more than 1000 words) from all the colleagues of BPR. The last date for submission of the note is 31 May 2012. The note can be sent by email to the Editor (editorjournalgsi@gmail.com) or Managing Editor (jgsi.journl@gmail.com).