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Observations on the Lower Cambrian ichnospecies *Monomorphichnus multilineatus* recorded from the Marwar Supergroup, India: A review

Sharma, M.¹, Pandey, S. K.¹, Ahmad, S.¹ and Kumar, K.²

1. Birbal Sahni Institute of Palaeobotany, 53 University Road, Lucknow–226 007, INDIA.

E-mail: mukund_sharma@bsip.res.in

2. Bond Business School, Bond University, QLD 4229, AUSTRALIA.

Sigmoidal scratches characterize the Lower Cambrian ichnospecies *Monomorphichnus multilineatus*. Specimens of *Monomorphichnus* are recorded from depositional environments ranging from shallow marine, wave dominated, to non-marine or brackish water and storm dominated sequences. The Nagaur Sandstone (NG), an established Lower-Middle Cambrian unit of the Marwar Supergroup, exposed in the western Rajasthan, India has yielded well preserved *M. multilineatus* specimens. NG is considered a result of deposition in an intertidal sand flat environment with episodic channel fluctuations, Pandey et al. [1]. Its occurrence in the intertidal regime adds another preservational realm for *M. multiliniatus* to already known depositional environments. A synthesis on genus *Monomorphichnus*, its mode of preservation, depositional environment, palaeoecology and taphonomy is presented in the present review. *Monomorphichnus multilineatus* is widely considered as swimming/feeding/grazing traces probably produced by the trilobites/primitive arthropod *Kodymirus vagans* in highly oxic environment just above the fair weather wave base Mikuláš, 1995 [2]. Its significance has been discussed in terms of feeding pattern in the water and sediment-water interface to understand the palaeoecology of trace producers. Observations on the systematics of *M. multilineatus* are based on the length, thickness of ridges/grooves, distance between two ridges and numbers of ridges which also help understand the behaviour, feeding pattern, population etc. Global distribution of *M. multilineatus* indicates its abundance in the Cambrian and the Ordovician, while other species ranges up to the Cretaceous Period. Hierarchical Cluster Analysis (HCA) was performed to establish the natural grouping of the specimens based on selected characteristics and average linkages. Results of HCA suggest that all the Nagaur specimens belong to one group *Monomorphichnus* and one species i.e. *multilineatus*. Pearson correlation between thickness and length of individual specimen was positive which indicate the requirement of food by adult individual specimen was more and thereby requiring more grazing to provide enough food for survival.

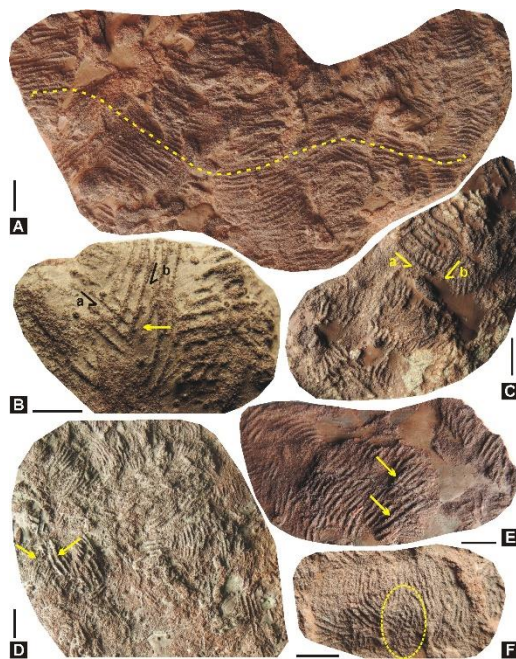


Figure1: Different types of ridge patterns probably produced by *K. vagans* preserved on the bedding plane. (Scale bar = 1.0 cm for A – F)

(A) Group of long sinuous ridges on the bedding plane showing wavy pattern.

(B) Criss-cross pattern of ridges show two different individuals.

(C) Same criss-cross pattern produced by the raptorial appendage of arthropod showing two different direction of locomotion (a & b); produced by probably two different sizes of arthropod; 'a' produced by big appendage whereas 'b' by smaller one.

(D) Slab showing different size of traces;

(E) Beautifully preserved traces showing its sinuous linearly arranged pattern.

(F) Obliquely criss-crossed sinuous pattern of ridges showing locomotion in different direction near the sediment

water interface.

References:

[1] Pandey, D K et al., (2014) J Asian Earth Sci 81: 29–141.

[2] Mikuláš, R., (1995). J. Czech Geol Soc 40: 37–45.

