



## **Middle Cambrian non-marine organic walled microfossils from the Algerian Sahara and their implications for the debate on the nature and origin of cryptospores**

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Well preserved, organic-walled microfossil assemblages have been recovered from previously undated, pre-Ordovician sandstone formations cored by well AMG-1 (El Arich El Megta), Djorf el Atfal concession, 200 km west of Colomb-Béchar, Algeria. The cored interval, between - 2104.0m and - 1792.9m, consists of fine grained to coarse sandstones. Most of the sandstone sequence is probably of fluvial origin, the finer grained interval representing marine incursions. Palynomorphs were recovered in most samples taken from these fine-grained layers and include several, age-diagnostic marine microphytoplankton (acritarchs) taxa such as *Adara alea*, *Cristallinium cambriense*, *Cristallinium randomense*, *Eliasum llaniscum*, *Timofeevia lancarae*, and *Timofeevia phosphoritica*. This assemblage clearly indicates marine sedimentation and undoubtedly testifies to a Middle Cambrian age for the deposits. In association with the acritarchs, other enigmatic palynomorphs occur, consisting of sub-spherical sporomorphs which are much thicker-walled than the associated microphytoplankton, show complex surface microsculpture (granulation, semi-punctuation), and are commonly arranged obligate dyad configurations. Clusters of 4 sporomorph organic cells occur which might be interpreted as tetrads. One single sporomorph specimen clearly shows a trilete mark. The sporomorphs display a narrow range of variability in cross diameter (averaging 40 microns) and consistent type of clustering. Morphological resemblance with *bona fide* previous records of terrestrially-derived Ordovician cryptospores (such

as those well known from Saudi Arabia), as well as geological and sedimentological evidence, are consistent with a non-marine origin for the Middle Cambrian AMG-1 sporomorphs. Accepting a broad definition of the term "cryptospore" as " a class of organic-walled microfossils of probable terrestrial origin", as recently proposed by Strother and Beck (2000), the present findings extend of some 40 million years back in time the first occurrence of cryptospores in the Gondwana supercontinent. Further investigations including biogeochemical analyses are in progress in order to establish the currently debated nature of these oldest "cryptospores" as freshwater algae or early land plant spores.

Reference:

Strother, P.K., Beck, J.H., 2000. Spore-like microfossils from Middle Cambrian strata: expanding the meaning of the term cryptospore. In: Harley, M.M., Morton, C.M., Blackmore, S. (Eds.), *Pollen and Spores: Morphology and Biology*, Royal Botanic Gardens, Kew, pp. 413-424.