SHORT NOTE

EDIACARAN METAPHYTES FROM THE LOWER KROL FORMATION, LESSER HIMALYA, INDIA*

VINOD C. TEWARI
Wadia Institute of Himalayan Geology, Dehra Dun-248 001

ABSTRACT

The present note describes the well preserved Ediacaran metaphytes (Vendotaenids) Krolotaenia gen. nov. and *Krolotaenia gnilovskayi* gen. et. sp. nov. from the Lower Krol Formation of the Korgai syncline, Himachal Pradesh, Lesser Himalaya, India.

INTRODUCTION

The Vendotaenids are the oldest multicellular macrophytes known in the early history of evolution of life on the Earth. Gnilovskaya (1971) recorded the oldest Vendotaenids from the East European platform and the Russian platform, USSR, from the Vendian/Ediacaran beds (≈ 650 Ma).

The Vendotaenids assemblage coincides with the biozones of the Ediacaran metazoans in Canada and are comparable with Russian platform and South Australian type assemblage (Narbonne and Hofmann, 1987). The Ediacaran metaphytes (brown macroalgae/ribbons) are found in the finely laminated Carbonaceous argillite and clay sequence of the Lower Krol Formation (Krol-A Member) exposed at 1 km NE of Birpa (30°34'59" : 77°39'15") in Korgai Syncline, Himachal Pradesh (Fig. 1). The Vendotaenids bearing beds are also characterised by the presence of sedimentary structures like parallel bedding, ripple bedding, wavy bedding, rhythmites and

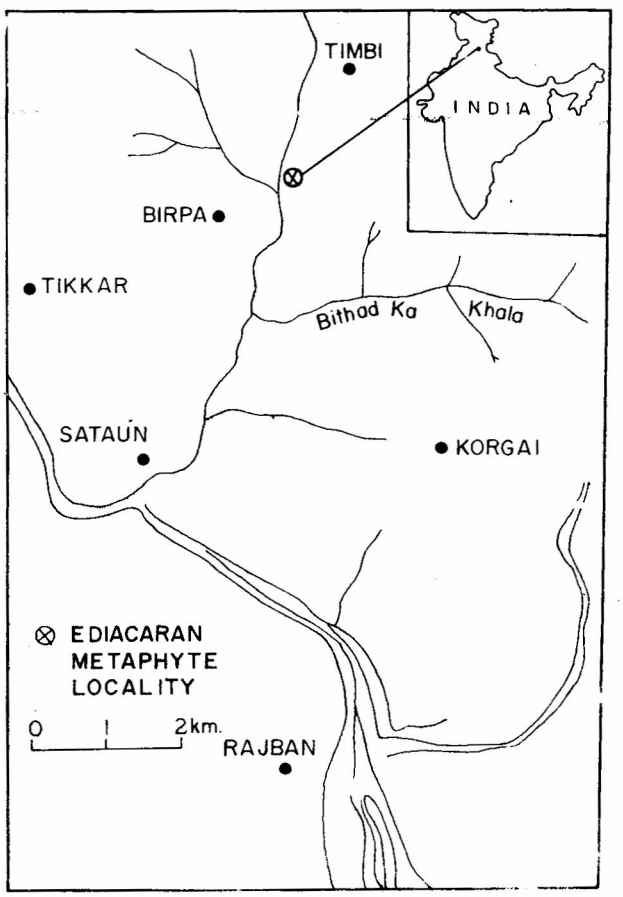


Fig. 1 Location Map

* This discovery from India was presented in the Indo-Soviet Symposium on "*Stromatolites andd Stromatolitic Deposits*" held at Wadia Institute of Himalayan Geology, Dehra Dun from 30th September - Ist October, 1988. Author has now included his studies of 1991 also.

small scale cross bedding suggesting the depositional environment in near shore shelf conditions.

Tewari (1988) and Tewari *et al.* (1988) have recorded Upper Proterozoic microbiota as well as stromatolites (*Protospheridium, Symplassospheridium, Gunflintia, Myxococcoides, Yugmaphyton, Stratifera, Irregularia, microstromatolites* and *Korgaicyatha* gen. nov, and also Lower Cambrian (Botomian/Lenian) brachiopods (*Obolella* sp., *Lingulella* sp.) besides stromatolites (*Ilicta talica, Collumnaefacta kergaiensis* and *Aldania birpica*) from the Blaini-Krol-Tal succession of the Korgai and Nigalidhar Synclines, Himachal Pradesh (Fig. 2). Subsequently, Kumar and Tewari (1988) and Tewari (1991) obtained carbon and oxygen isotopic signatures from Krol and Tal carbonates of the same horizon which indicate a positive shift for Krol carbonates (increase in organic carbon flux) followed by 13_C and 18_O depletion in Tal carbonates (decrease in carbonate sedimentation). The C,O isotope signatures have further supported the author's view (Tewari, 1984) that the Precambrian/Cambrian boundary (Tommotian Stage) lies in the Lower Tal Formation (Chert Phosphorite Member).

The distribution of pre-Ediacaran biota, Ediacaran (macrophytes) and Lower Cambrian fossils in the Blaini-Krol-Tal succession of the Korgai Syncline is shown in Fig. 2.

DESCRIPTION

Group- VENDOTAENIDES. Gnilovskaya, 1971

Genus- KROLOTAENIA Gen. nov.

TYPE SPECIES: *Krolotaenia gnilovskayai* sp. nov.

DIAGNOSIS: Curvilinear and more or less straight ribbons of centimetric length and millimetric width; lateral branching is frequent and ribbons untwisted; infrequent branching of a single ribbon into two parallel ribbons.

ETYMOLOGY: Named after Krol Formation where the macrophytes occur in great abundance.

Type Locality: 1 km NE of Birpa (30°34'50" : 77°39'15") in Korgai Syncline, Himachal Pradesh, India.

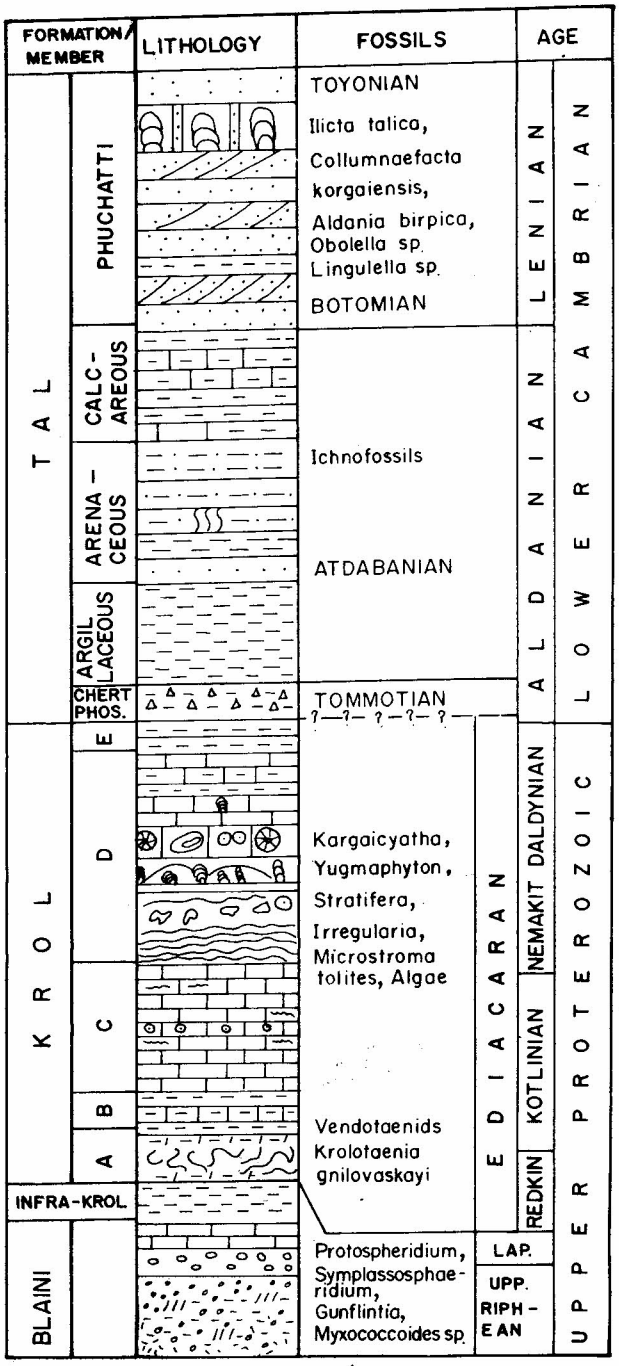
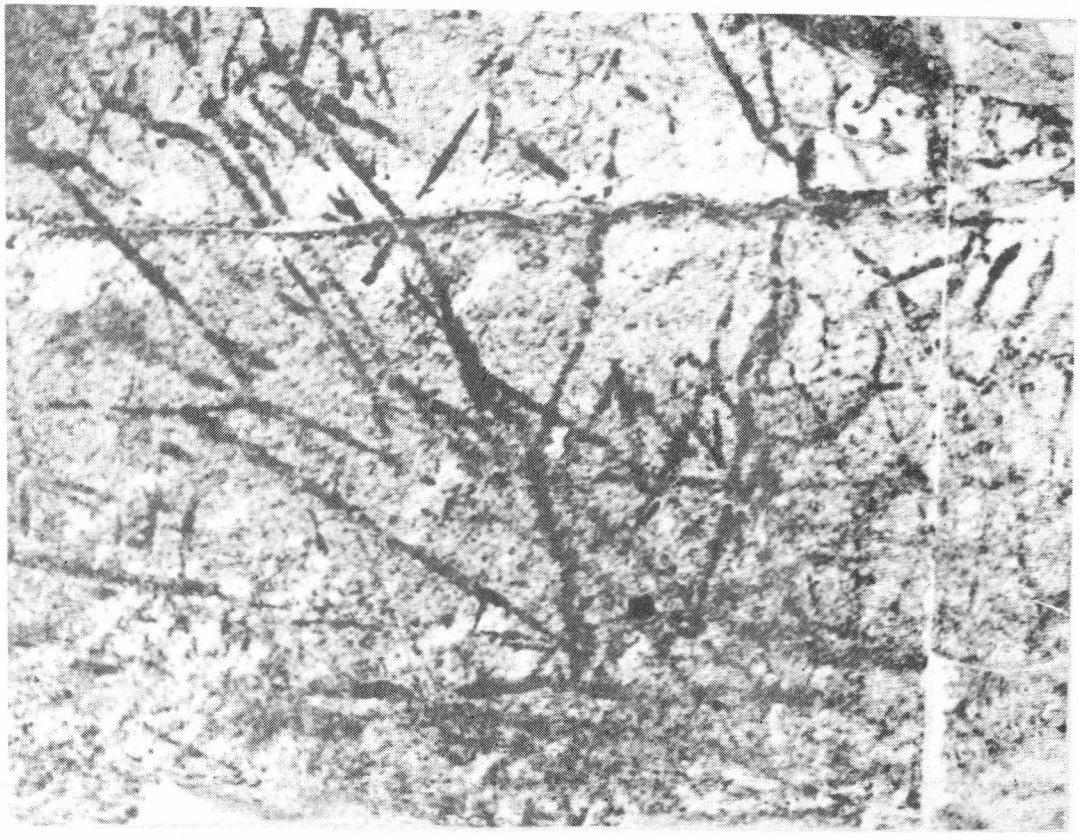


Fig. 2 Lithocolumn of Blaini-Krol-Tal Succession, Kargai Syncline, Himachal Pradesh Showing Upper Riphean Ediacaran and Lower Cambrian Fossils.



Photograph of specimen of *Krolotaenia gnilovskavi* gen. et. sp. nov.

Fig. 3

TYPE HORIZON: Member A of Lower Krol Formation, Lesser Himalaya.

Krolotaenia gnilovskayi sp. nov. (Figs. 3 and 4)

DIAGNOSIS: Same as for genus, Ribbons 0.5 - 5 cm long and 0.5 - 2 mm wide.

TYPE SPECIMEN: Holotype WIF/A-1301/1988

ETYMOLOGY: Named in honour of Dr. (Mrs.) Marina B. Gnilovskaya who first established the Group Vendotaenids (in 1971) from the East European platform and the Russian platform, USSR.

TYPE LOCALITY: 1 km NE of Birpa (30°34'50" : 77°39'15") in Korgai Syncline, Himachal Pradesh.

TYPE LITHOLOGY AND HORIZON: Finely laminated grey carbonaceous argillites/shales (rhythmites) of Memer A of Lower Krol Formation, Korgai Syncline, Himachal Pradesh, Lesser Himalaya.

DESCRIPTION: Ribbon like imperssions are preserved on the bedding planes. Ribbons greenish grey, more or less straight, not twisted, curvilinear, frequently

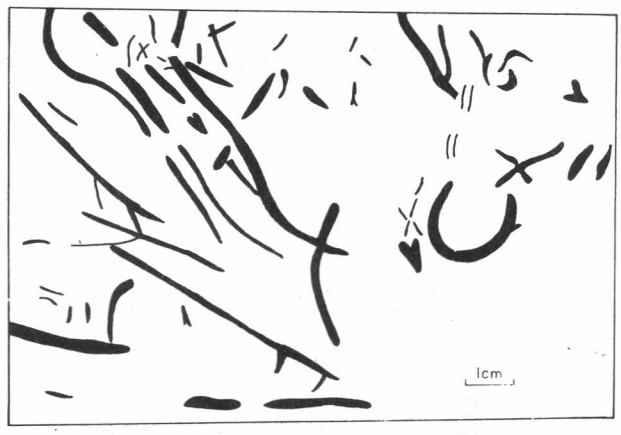


FIG. 4 Drawing of Specimens of Krolotaenia gnilovskayi gen. et. sp. nov., Compare with Figure 3

laterally branching (sometimes branching into two parallel ribbons); crossing of ribbons common (Fig. 3 and 4). Longest straight ribbons showing parallel to sub- parallel orientation, width of individual ribbons not uniform, ranging from 0.5 to 2 mm in width and

length varies from 0.5 to 5 cm. Some hair pin bends are also observed.

DISCUSSION

The *Krolotaenia gnilovskayi* may be compared with *Daltaenia mackenziensis* Hofmann described from the Little Dal Group, Mackenzie Mountains Supergroup, Northwestern Canada and *Tyrasotaenia* (Gnilovskaya, 1971) from the Vendian of East European platform, USSR. Compared to the new genus and species *Deltaenia mackenziensis* is characterised by unbranched ribbons, infrequent lateral branching, greater rigidity and their association with abundant *Chuaria circularis*. *The genus Tyrasotaenia* differs from *Krolotaenia* by its unbranched, twisted and crumpled ribbons.

The specific characters of the Lower Krol ribbons like branching, frequently lateral branching, cross overs of ribbons are clearly different from other known Upper Proterzoic/Ediacaran/Vendian metaphytes. Thus, the erection of a new genus, *KROLOTAENIA* is warranted.

ACKNOWLEDGEMENTS

The author is grateful to Dr. (Mrs.) Marina B. Gnilovskaya of Institute of Precambrian Geology and Geochronology, Academy of Sciences, Leningrad, (St. Petersberg) USSR for kindly examining the specimens of *Krolotaenia* and giving valuable suggestions. The author is thankful to Dr. N.S. Mathur of WIHG for going through the manuscript and to Dr. B.S. Venkatachala, former Director, B.S.I.P., Lucknow for encouragement. Dr. V.C. Thakur, Director, Wadia Institute of Himalayan Geology, Dehra Dun is thanked for providing the necessary facilities.

REFERENCES

GNILOVSKAYA, M.B.
1971 *The oldest aquatic plants of the Vendian of the Russian platform.* Palaeont. Zhur. V. 1, pp. 101-107 (in Russian).

KUMAR, B. and TEWARI, V.C.
1988 *Isotopic signatures of Precambrian/Cambrian carbonates from Korgai Syncline, Lesser Himalaya, Indo-Soviet Symposium on Stromatolites and Stromatoltic Deposits.* Wadia Instt. of Himalayan Geol., Dehra Dun, September 30th- October Ist, pp. 5-6 (abstract).

NARBONNE, GUY M. and HOFMANN, H.J.
1987 *Ediacaran biota of the Wernecke Mountains, Yukon, Canada.* Palaeont. V. 30, (4), pp. 647-676.

TEWARI, VINOD C.
1984 *Stromatolites and Precambrian - Lower Cambrian biostratigraphy of the Lesser Himalaya, India.* Proc. V. Indian Geophytol. Conf. Lucknow (1983), pp. 71-97.
1988 *Discovery of Vendotaenides from India.* Indo-Soviet Symposium on Stromatolites and Stromatolitic Deposits. Wadia Instt. of Himalayan Geol., Dehra Dun, September 30th - October Ist, 1988, pp. 25-28 (Extended abstract).

TEWARI, VINOD C., MATHUR, V.K. and JOSHI, A.
1988 *Discovery of Lower Cambrian (Lenian) Stromatolites from Phulchatti Member (Tal Formation), Korgai sycline, Lesser Himalaya, India.* Indo-Soviet Symposium on Stromatolites and Stromatolitic Deposits. Wadia Instt. of Himalayan Geol., Dehra Dun, Sept. 30th - October - Ist, 1988, pp. 28-30 (abstract).

TEWARI, V.C.
1991 *The Carbon and Oxygen isotope trends of the Deoban-Blaini-Krol- Tal Microbial carbonates from the lesser Himalaya. Geoscience Journal Vol. XII no. 1 pp. 13-16.*