

Silurian non-calcified algal flora from the Kalana Lagerstaette, Estonia

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The non-calcified algal floras were probably widespread in the Paleozoic seas, but this view can be proved with exceptionally preserved fossils only.

The non-mineralized or weakly calcified algal species are rarely preserved and have been found in few Lagerstaetten only. Therefore the extent of their stratigraphic ranges and richness of their geologic history has probably been strongly underestimated.

Up to now only 14 species of non-mineralized algae have previously been reported from the entire Silurian System around the world.

The Early Silurian algal Lagerstaette in Kalana, Estonia, has revealed rich non-mineralized algal flora, which on the basis of external morphology are assigned to Rhodophyta and Chlorophyta. Most of the material occurs within the light to dark brown organic-rich, microlaminated, partly dolomitized limestones.

Kalana quarry in Central Estonia is by far the richest and best preserved algal deposit in the Early Paleozoic. In the Kalana material we can distinguish at least ten morphological species. This marks a considerably higher diversity than has been documented in the Cambro-Silurian strata up to now.

The most common algal fossil in these shelf carbonates is a red algal species *Leveilleites hartnageli*, which was originally described by Foerste in 1923 from roughly coeval sediments in southern Ontario, Canada.

The thalli of this type are up to 7 cm high, with a 1-2 mm wide axis. Each specimen has 10-20 primary branches, most of them about equal in length and 12-25 mm long. These branches bear 10-30 so called tufts, consisting of 20-30 up to 1 mm long laterals and arranged in either side of the 1st-order laterals. We are able to designate two distinct macroscopic phases (a haploid and diploid phase) of the life cycle of *Leveillites*.

Many algal fossil of Kalana - *Medusaegraptus* sp., *Chaetocladus* sp., *Inopinatella* sp., and *Cymopolia* sp. - belong to the green algae of the order Dasycladales. Dasyclads are unicellular and radially symmetrical macroalgae with siphonous organization. This highly diverse group has a long geological history, but is dominated by calcareous forms.

The fossil evidence from the Kalana Lagerstaette suggests, that some of the algae may have maintained their basic morphology almost unaltered for over 400 million years, with the main innovation being the extracellularly laid calcium carbonate skeleton and the algal floras were probably widespread in the Paleozoic seas.

Non-geniculate coralline algae and foraminifers as main constituents in microfacies types of 'Leitha Limestone', Middle Miocene, north-eastern Leithagebirge, Austria

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The Historic Quarry Project aimed at the identification and investigation of natural stones that proved historically important for buildings and monuments by means of linking their quarry provenance with their applications. In this respect, Leitha Limestone, being one of the most famous building stones in Vienna, Bratislava and Graz, was chosen. To fill the blind spot due to the military inaccessibility of abandoned quarries distributed between Kaisersteinbruch and south of Bruck/Leitha these were selected for investigation and a