

CORALGAL FACIES OF THE UPPER EOCENE-LOWER OLIGOCENE LIMESTONES IN LETCA-RĂSTOCI AREA

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ABSTRACT. In this paper are described the coralgal facies identified in the Upper Eocene-Lower Oligocene limestone succession (Cozla Formation) outcropping in two quarries at Letca and Rastoci (Sălaj district, Romania). In the studied profiles the coral and algae limestones are interlayered with bioclastic limestones with foraminifera. On the top of relatively deep water deposits, coral and algae crusts and dendritic corals coated by algae were deposited. The environment registered a gradual deepening, the deposits being completely immersed, while bioclastic limestones with foraminifera were recurrently formed. This cycle is repeated, the whole succession being characterized by several such "parasequences".

KEYWORDS: corals, algae, Eocene, Oligocene, Răstoci, Letca, Transylvania, Romania.

Introduction

The limestones outcropping in Letca and Răstoci quarries belong to Cozla Formation. Rusu (1977) described Cozla Formation as a comprehensive series representing the lateral extension of a series comprising the Cluj Limestone, the *Nummulites fabianii* horizon, the marls with bryozoans and the basal part of the Mera Formation in Preluca area.

The limestones belonging to Cozla Formation develop as metric banks, generally showing a massive texture. They mainly consist of coral-algal levels. Besides, micrites, biomicrites and biosparites with foraminifera were identified. (Meszaros et al., 1989).

The Cozla Limestone represents a carbonate formation consisting of skeletal (miliolidic, nummulitic, coralligenous) limestone. The coral or algal reef limestones formed on a stable carbonate platform in Țicău-Preluca area (Popescu, 1976).

Răstoci Quarry (Fig.1 A-B)

The quarry is situated in Sălaj district and is located in the neighbourhood of Rastoci locality, on Seaca Valley (right tributary of Someș River).

In the basal part of the quarry *Nummulites fabianii* level was identified, while at the upper part the *Pycnodonte gigantea* level outcrops. Chronostratigraphically, *Pycnodonte gigantea* level is the marker between the Eocene and Oligocene in the northwestern part of Transylvania. The two stratigraphic markers are useful in correlating the Priabonian-Early Oligocene Cozla Limestone and the Brebi Marls.

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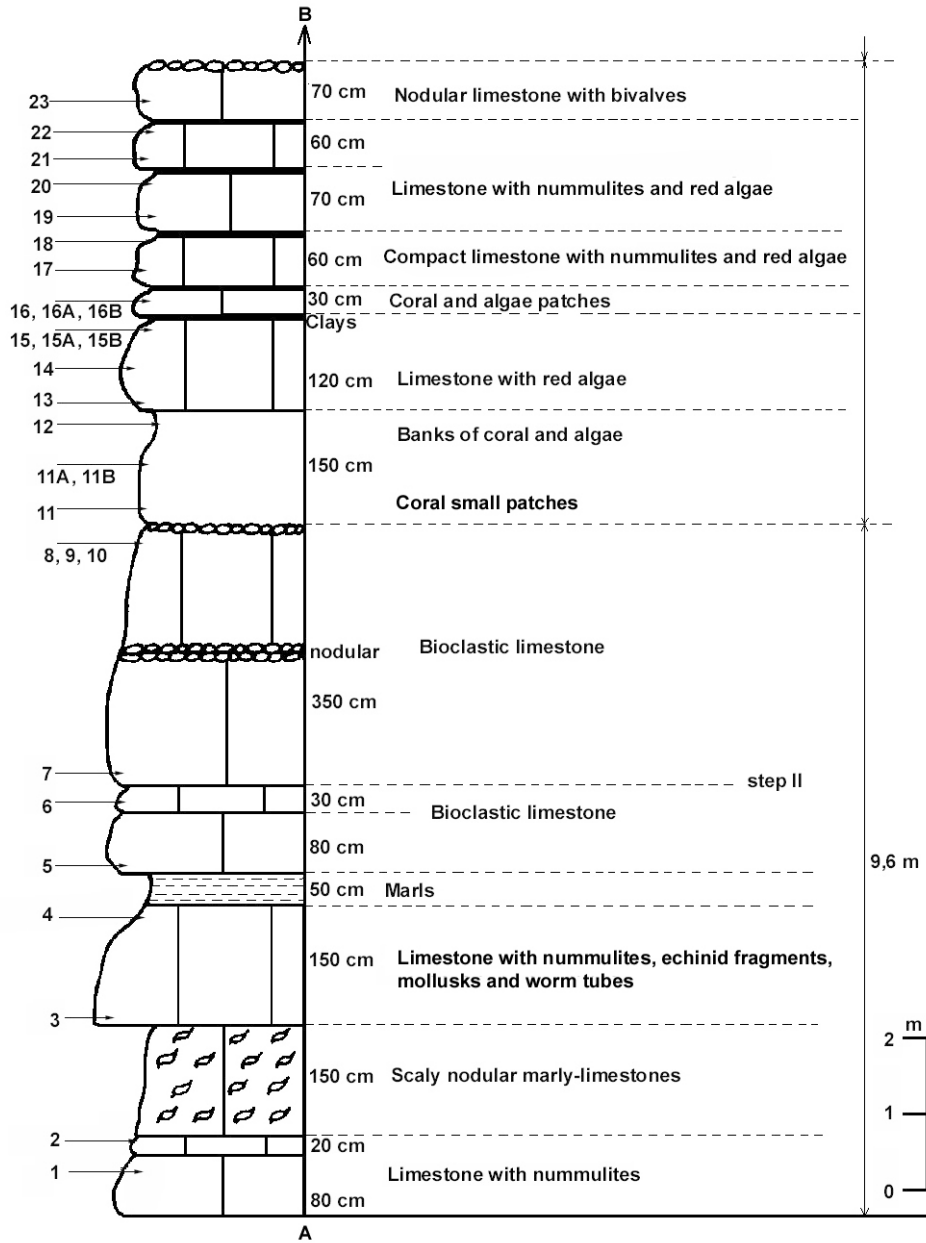


Fig.1 A-Profile in the Eocene-Oligocene limestones from Răstoci quarry

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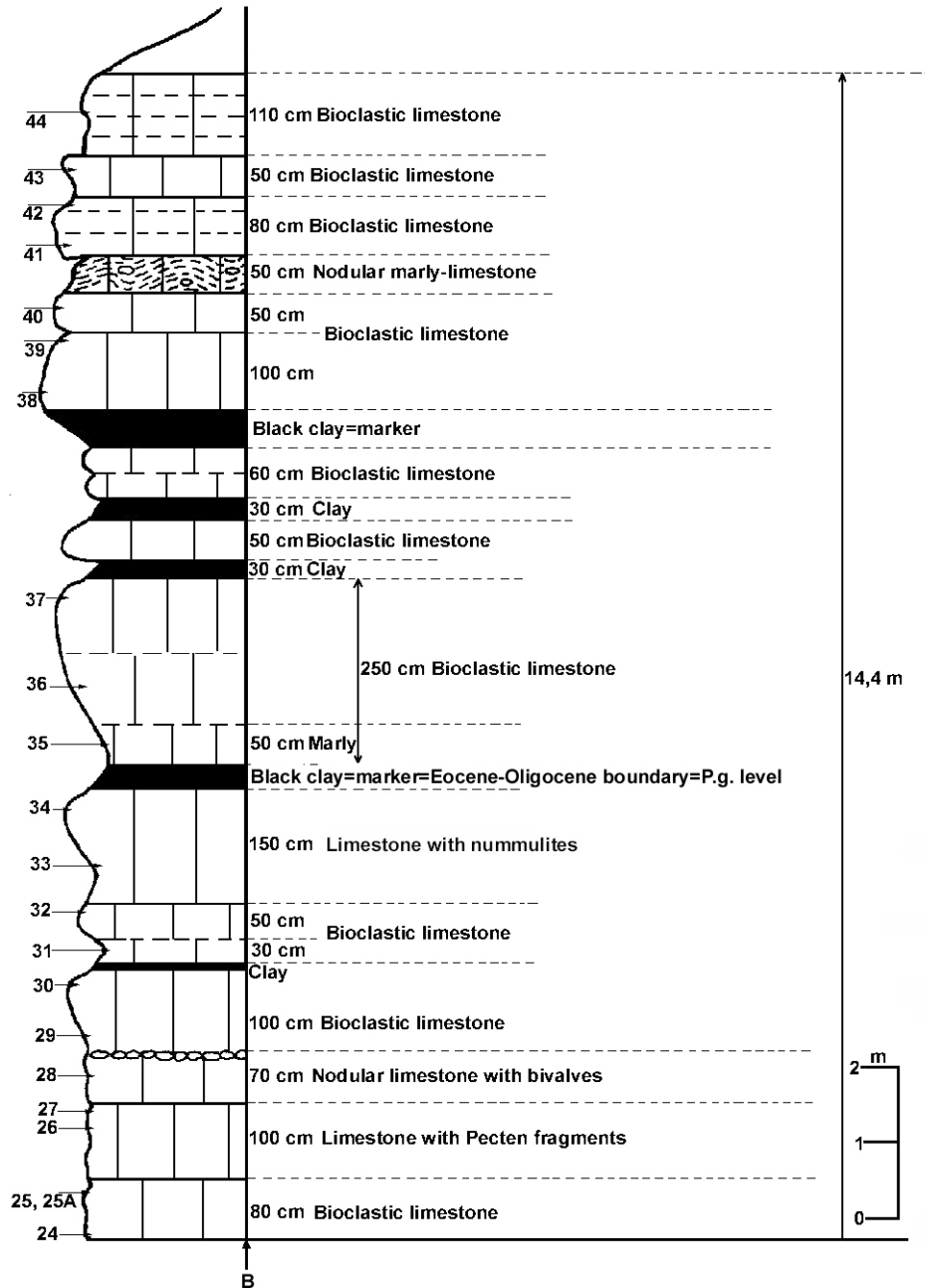


Fig.1 B-Profile in the Eocene-Oligocene limestones from Rästoci quarry

The faunal association of the limestones in Răstoci quarry is represented by mollusks (bivalves, gastropods, cephalopods), echinoderms, arthropods and foraminifera. They contain also a reach assemblage of calcareous red algae.

The foraminifera are ubiquitous along the profile, starting with the basal *Nummulites fabianii* level. Besides, species of other nummulites and miliolides were noticed. Locally, corals give birth to small patch-reefs.

The limestones with nummulites (*Nummulites fabianii* level) form the basal part of the quarry, are overlaid by nodular marly-limestones, followed by limestones with nummulites, and limestones with echinid, mollusk and worm tubes fragments. On their top, marls and bioclastic limestones develop.

The above mentioned succession has a thickness of about 9.6 m and represents a relatively deep water facies; especially the worm tubes mark a more quiet environment, with a reduced hydrodynamics.

On the top of the bioclastic limestones a shallower facies with corals and algae follows on about 4.9 m thickness.

They start with coral patch reefs, followed by banks with corals and algae, and limestones with red algae. They are again overlaid by patches of corals and algae followed by limestones with nummulites and red algae on their top. The red algae and the corals – frequently fragmented and broken, plead for a shallow depth of the waters and a more active dynamics. The limestone banks are intercalated with thin clay deposits.

A new succession of about 14.4 m follows, indicating a deeper water environment. It consists, from the bottom to the top, of nodular limestones with bivalves, bioclastic limestones, limestones with pectinid fragments and limestones with nummulites. The upper part consist of black clay, representing *Pycnodonte gigantea* level (the Eocene-Oligocene boundary). Above this limit the facies became more marly-dominated; bioclastic limestone banks separated by relatively thick black clay interlayers follow. On their top, a new black clay marker layer is present, covered by bioclastic limestones and nodular marly-limestones up to the top of the quarry.

Letca Quarry (Fig.2 A-D)

This quarry is situated also in Sălaj district and is located at about 1 km N-NV from the center of the Letca locality. The basal level of the profile about 9.5 m thick is represented by a deep water facies. The deposits consist of marls with echinids and vertebrate rests, marly-limestones with nummulites, red clays with bivalves, nummulites and clays with echinids. Bioclastic limestones, limestones with nummulites and a clayey level with nummulites follow.

The next 15 m of the succession host the first stage of development of the coralgal facies. Clays with worm tubes and coral crusts encrusting the nummulite limestone were noticed. Over the coral crusts, algal crusts formed. A dendriform coral construction overlays them, covered in its turn by algal crusts (mixed crusts with algae and corals). On the top of this construction, a new bioclastic level is present, followed by a new cycle of algal crusts coating the coral fragments in the lower part, dendriform corals surrounded by encrustations, and again dendriform corals in the upper part.

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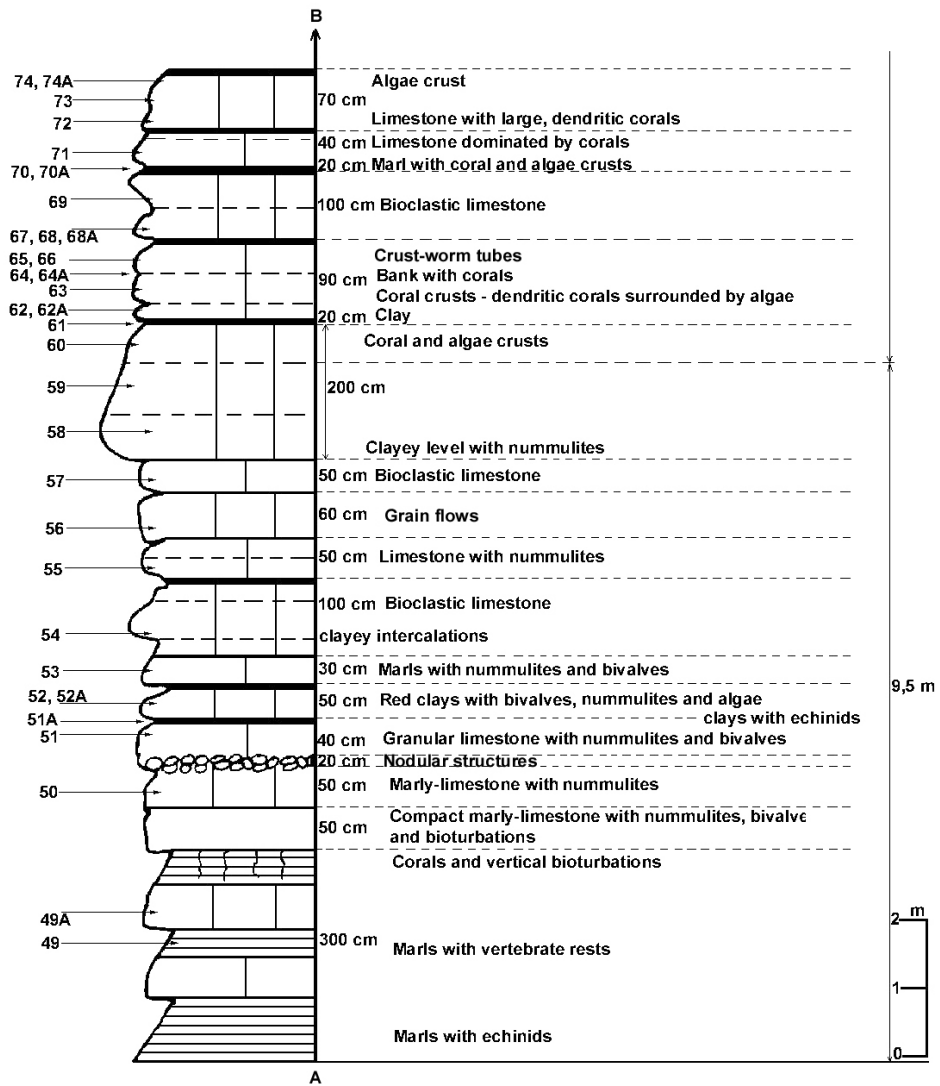


Fig.2 A-Profile in Eocene limestones from Letca quarry

The whole above-mentioned succession is covered by breccia, followed by a thin coral and algal crust, and by dendriform corals.

Crusts of *Pseudolithothamnium album* (Peyssonneliaceae) were identified, indicating a shallower environment. A more compact coralligenous level overlays them, and then the facies become deeper.

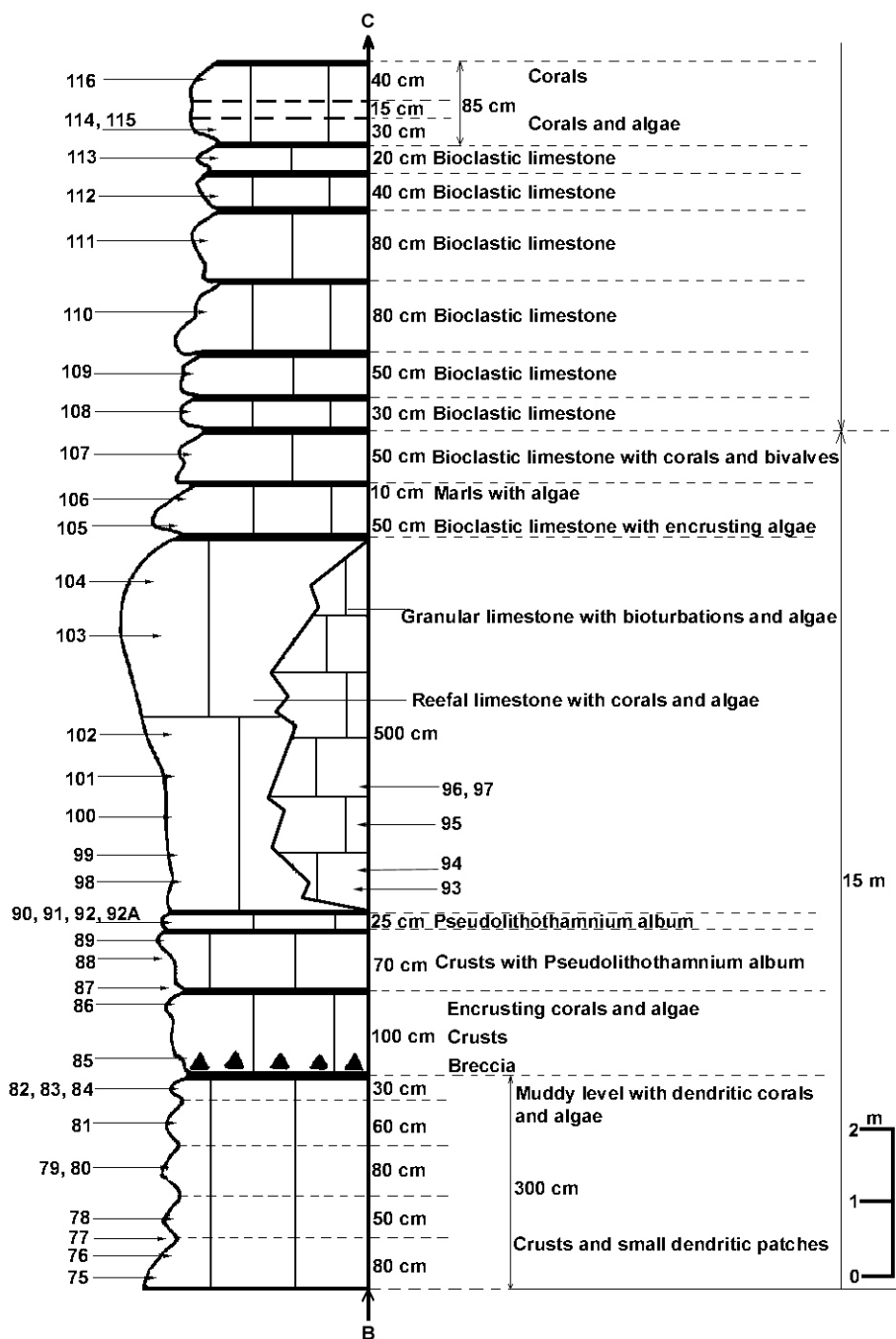


Fig.2 B-Profile in Eocene limestones from Letca quarry

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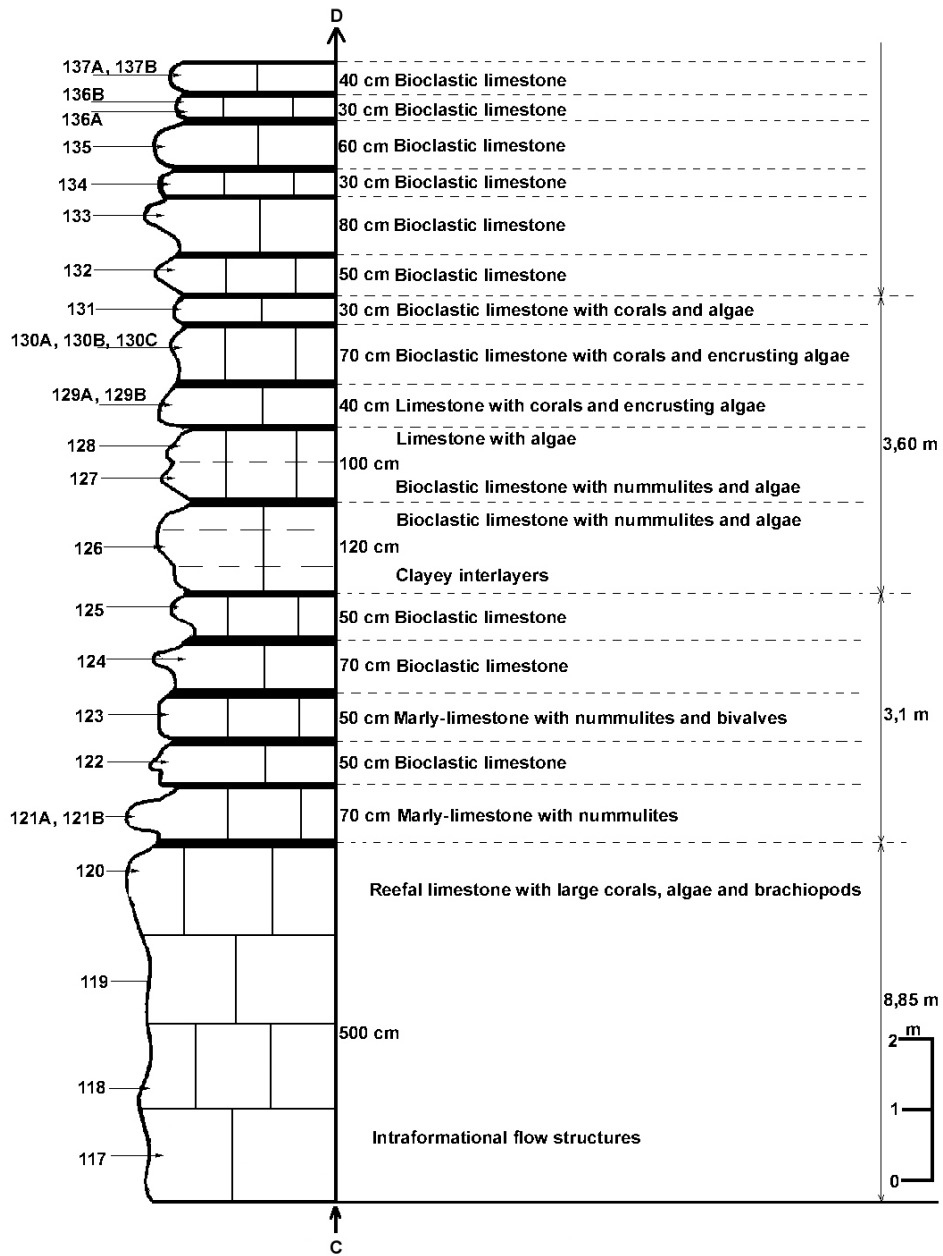


Fig.2 C-Profile in Eocene limestones from Letca quarry

The following 3 m host a succession of bioclastic limestones, followed by about 5.8 m of coral and algal crusts, dendritic corals, coral reefs with large corals, algae and brachiopods.

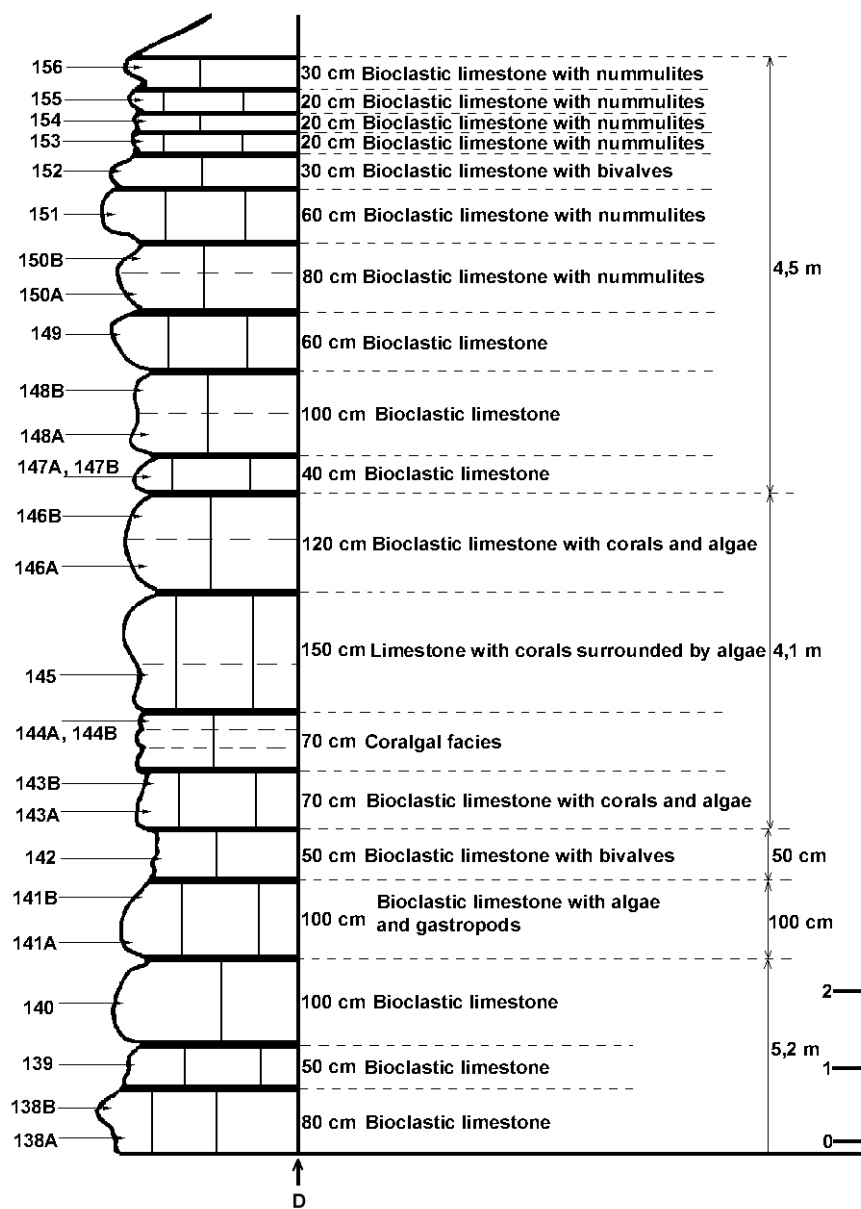


Fig.2 D-Profile in Eocene limestones from Letca quarry

The succession over the next 3.1 m indicates a deeper facies with marly-limestone, and bioclastic limestone with nummulites and bivalves.

A new stage of development of the coralgal facies can be recognized over about 3.6 m, consisting of bioclastic limestones with nummulites, and red algae, followed by bioclastic limestones with corals and encrusting algae.

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A gradual deepening of the environment is indicated by bioclastic limestones (about 5.2 m thick).

On their top, bioclastic limestones with algae and gastropods (1 m thick), followed by bioclastic limestones with bivalves (about 50 cm) formed.

The next 4 m host the last stage of development of coralgal facies represented by bioclastic limestones with corals and algae, and corals surrounded by algae.

At the top of the quarry, over about 4.5 m, only bioclastic limestones and limestones with nummulites were noticed.

In conclusion: the limestone succession within Cozla Formation outcropping in Letca and Răstoci quarries can be best described as coralgal-bioclastic "parasequences" developed on a marly-substrate and constituting recurrent cycles.

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