RUDISTID BIOSTROMS IN THE LIPICA QUARRY NEAR SEŽANA (SW SLOVENIA)

RUDISTNE BIOSTROME V KAMNOLOMU LIPICA PRI SEŽANI (JZ SLOVENIJA)

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Mario Pleničar & Jožef Vesel: Rudistne biostrome v kamnolomu Lipica pri Sežani (JZ Slovenija)

Kamnolomi Lipica pri Sežani na primorskem krasu so sedaj največji kamnolomi naravnega kamna v Sloveniji. Stratigrafsko zaporedje plasti je sestavljeno iz treh litotipov: "Lipica fiorito" (Lipica rožasti), "Lipica unito" (Lipica enotni) in "glažavec". V vseh treh litotipih najdemo isto fosilno favno, značilno za santonijsko in campanijsko stopnjo. Favno in karbonatne litotipe v kamnolomu Lipica lahko primerjamo s podobnimi v Cava Romana pri Nabrežini v Italiji.

Ključne besede: Lipica, kamnolomi, karbonatni litotipi, santonijske in campanijske biostrome

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Mario Pleničar & Jožef Vesel: Rudistid Biostroms in the Lipica Quarry near Sežana (SW Slovenia)

Of the great number of quarries in Karst, now only the Lipica quarry is active. There are two kinds of limestone suitable for ornamental purposes in the building industry, in the stonemasonry nominated "fiorito" and "unito". From bottom to top in the Lipica quarry section two lithological intervals are present: - lower interval ("fiorito") is one of the coarse grey micritic limestones with the period of hippuritid and radiolitid biostroms - upper interval ("unito") is the massive bedding bioclastic limestone with very fine rudist fragments. The fossil fauna is typical of the Upper Senonian age.

Key words: Lipica, quarry, carbonate lithotype, Santonian and Campanian biostroms

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A group of the quarries of the natural stone Lipica is about 6 km SE from Sežana in the area of the typical littoral karst. At present the blocks of the natural stone in two quarries Lipica-1 and Lipica-2 are exploited. Lipica-1 is at 0,6 km from the crossroads of the roads Sežana-Lokev and Sežana-Lipica. Lipica-2 is only 0,2 km from the same crossing.

In the quarry Lipica-1 more than 1000 m^3 of the blocks were exploited annually through some decades, and now it is the largest quarry of the natural stone in Slovenia.

Because of the flat topography the quarry is developed as deep open pit of 90 x 60 m, about 40 m deep.

The quarrying activity started 2000 years ago in the Roman age like in the Cava Romana near Aurisina.

The quarrying is carried out at different levels with the diamond wire saw, percussive drilling, hydraulic pushing, rarely delicate mining, with the mechanical and manual formulation and hoisting and loading with the derric crane.

The province of the Lipica quarries belongs to the so-called Nabrežina horizon.

Two deep quarries near Lipica are characterized by a series of grey micritic and bioclastic limestones. The open pit quarry Lipica-1 pertains to the northern flank of a small synclinal fold of axial direction NNW-SSE. The beds dip 10 to 35^0 southwestward. The stratigraphical sequence is constituted of three lithotypes:

Below is the lithotype "Lipica fiorito" (florid Lipica). The rock is light grey micritic limestone with very abundant bioclasts (Rudists) which are subparallel to the bedding. The rock is compact, solid or thickly bedded. The thickness of the level was estimated to 45 m.

Higher we observe the lithotype "Lipica unito" (unitary Lipica), the light breccious limestone (rudistid limestone) of massive bedding with the metric period. The unbroken shells of rudistids and the rudistid fragments have some mm to cm in size. The thickness of "Lipica unito" can be also about 40 m.

Both horizons, "Lipica fiorito" and "Lipica unito" are exploited as natural stone. Frequent lateral and vertical variations of facies can be detected.

The uppermost part of the Lipica sequence is the bioclastic grey to dark-

grey limestone with rudist fragments, and bedding with the periods from 50 to 200 cm. This is the so-called "glaževec" (glassy stone) with the periodic repetitions of "Lipica fiorito" and "Lipica unito" lenses.

On the Triest-Komen Plateau the numerous patch reefs of the Senonian age are known. The "Lipica unito" has been formed in the area of fore-reef zone with the higher energy of the waviness, quite different of the "Lipica fiorito" and "glaževec" originating in the more calm water between the patch-reefs.

The later recrystallization of both types of the limestones was the favourable moment for the suitable physical - economical properties. The chemical composition of both limestones is quite similar. Both varieties are pure limestone. The carbonatic component exceeds 98%.

From the stratigraphical viewpoint, the sequence of the Lipica limestones is of Senonian age. All three lithotypes are extremely rich in rudists.

The shells are well preserved, but it is hard to obtain the undamaged fossil remains from the dense carbonatic rock. Frequently just numerous valve sections on the cutting surfaces of the limestone in the quarry can be observed and studied, especially in the vertical walls. The sections of the dark coloured shells are sometimes subparallel to bedding.

In the limestone of the lithotype "Lipica fiorito" the rudists are confined to the belts from 10 to 50 cm thick. The intermediate rocks are without rudists. The intervals rich in rudists represent the sections of biostroms, but sometimes the valves are accumulated also as fossiliferous breccias.

In the limestone of the lithotype "Lipica fiorito" the following rudist specimens typical for the backreef area were determined: Bournonia retrolata (Astre), B. cf. murensis Pejović, B. parva Pejović, Biradiolites zucchii Caffau & Pleničar, Katzeria hercegovinaensis Slišković, Pseudopolyconites sp. and Apulites sp.

Similar fauna but from the forereef zone was found in the "Lipica unito" lithotype with rudists: Hippurites sp., Bournonia parva Pejović, Biradiolites angulosissimus Toucas, Durania martellii Parona, Gorjanovicia costata Polšak, Pseudopolyconites hirsutus (Patrulius), Katzeria hercegovinaensis Slišković and Sauvagesia sp.

The biostrome in the uppermost lithotype, the "glažavec", represent periods from 50 to 200 cm. The frequent fossil remains represented by genera Bournonia, Gorjanovicia, Sauvagesia, Biradiolites and Katzeria confirm the Upper Senonian age.

In all mentioned carbonate lithotypes of the Lipica quarry occurs the same fossil fauna which pertains to the early Senonian age. The specimens: Bournonia parva Pejović, Katzeria hercegovinaensis Slišković, Gorjanovicia costata Polšak and Biradiolites zucchii Caffau & Pleničar but are typical fossils for the Santonian and Campanian stage.

The specimen Bournonia parva is characteristic after Pejović for Lower

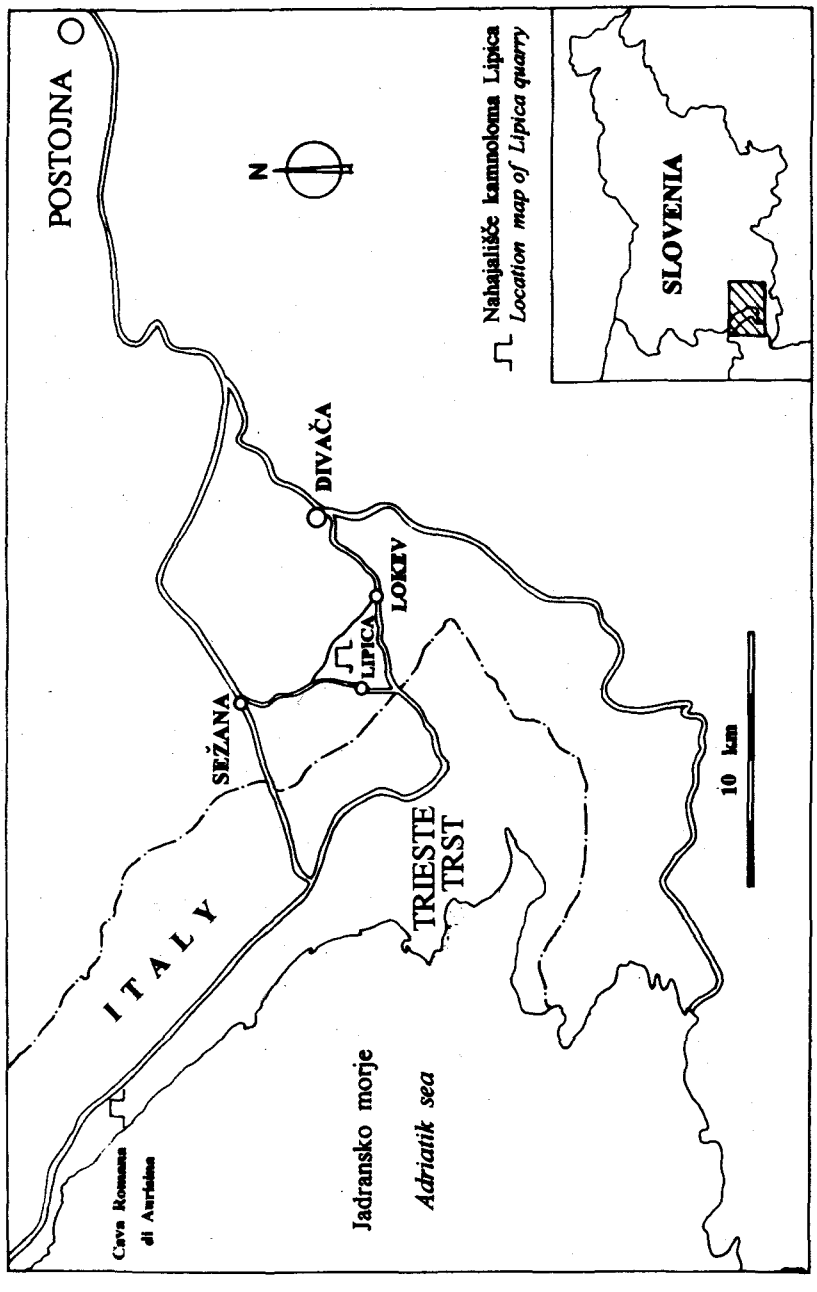

Fig. 1. Location map of Lipica quarry
Sl. 1. Nahajališče kamnoloma Lipica

Campanian of Brač island (Pejović 1988). Katzeria hercegovinaensis was ranged by Slišković and Polšak et al. in the Upper Campanian and in the Maastrichtian of Bosnia and Dalmatia (Slišković 1966; Polšak & Bauer & Slišković 1982). Gorjanovicia costata is typical after Polšak to Santonian and Lower Campanian stage of Istria (Polšak 1967). Biradiolites zucchii Caffau & Pleničar was found also in Cava Roman (Roman Quarry) near Aurisina (Italy, NW of Triest) in the upper part of the "Borgo Grotta Gigante Formation" which is of the Upper Senonian age (Caffau & Pleničar 1991).

The fauna and the carbonate lithotypes in the Lipica quarry can be compared with the similar or equal ones in the Cava Romana quarry near Aurisina. The stratigraphic sequence at Cava Romana is after Cucchi et al. constituted of lithotypes A to D of the "Borgo Grotta Gigante Formation" appertaining to the Upper Senonian. The fauna of the Cava Romana limestone consists of species: Hippuritella cf. castroi (Vidal), Hippurites nabresinensis Futterer, H. heritschi Kühn, Gorjanovicia costata Polšak, Rajka pejovicae Milovanović, Bournonia africana Douvillé, B. retrolata (Astre), B. parva Pejović and Katzeria hercegovinaensis Slišković (Cucchi et al. 1987). At least six species of radiolitids at Lipica and in Cava Romana are the same, and they are typical for Santonian and Campanian stage. The lithotype A in Cava Romana quarry can be compared with the "Lipica fiorito", the lithotypes B and C with the "Lipica unito", and the lithotype D with the "glažavec" in the Lipica quarry.

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Povzetek

V dveh kamnolomih v Lipici blizu Sežane izkoriščajo kot naravni kamen dve vrsti apnenca. Prvi je masivni oziroma zelo debelo skladnat mikritni in bioklastični apnenec, imenovan v kamnoseštvu "Lipica fiorito" (Lipica rožasti). Na njem leži bolj brečast "Lipica unito" (Lipica enotni). Tudi ta je masiven in primeren za kamnoseštvo. Oba izkoriščajo kot naravni kamen. Krovnino obeh predstavlja plastnati "glažavec", iz katerega zaradi razmeroma tanke plastnatosti in tudi manj ugodnih lastnosti ne pridobivajo blokov za prodajo. Oba kamnoloma pri Lipici sta izdelana v ravninskem svetu pod nivojem okolice. Bloke apnenca dobivajo z žično diamantno žago, udarnim vrtanjem, šibkim miniranjem ter ročnim in mehaničnim obdelovanjem. Iz kamnoloma dvigajo bloke z dvigali tipa derrick.

Obe vrsti apnenca, ki ju izkoriščajo kot naravni kamen, imata ugodne fizikalne in ekonomske lastnosti zaradi ponovne kristalizacije, ki sta jo doživela v globini. Vsebujeta nad 98% karbonatne komponente. Klaste predstavljajo lupine rudistov, pretežno radiolitov. Litotipa "Lipica fiorito" in "glažavec" sta nastajala v razmeroma mirni morski vodi v zagrebenski coni ali morda tudi med malimi grebeni (patch-reefs), ki so jih gradili rudisti. Litotip "Lipica unito", ki je bolj brečast, kaže na izvor v predgrebenski coni, kjer je bilo valovanje morja močnejše.

Iz goste karbonatne kamnine ne moremo izpreparirati celih lupin fosilov, pač pa preučujemo njih preseke na ravno odrezanih apnenčevih stenah v kamnolomu ali pa na blokih. Lupine so koncentrirane v pasovih. ki predstavljajo preseke biostrom. Vmes so pasovi apnenca brez fosilov. Temne lupine se lepo odražajo od svetlo sivega apnenca.

Vrste Bournonia retrolata (Astre), B. cf. murensis Pejović, B. parva Pejović, Biradiolites zucchii Caffau & Pleničar, Gorjanovicia costata Polšak, Pseudopolyconites hirsutus Patrulius in Durania martellii Parona so značilne za santonijsko in campanijsko stopnjo zgornjega senona.

Obe vrsti apnenca, ki ju izkoriščajo kot naravni kamen in tudi fosilno favno v kamnolomih Lipica, lahko primerjamo z apnencem, ki ga izkoriščajo na italijanski strani v kamnolomih Cava Romana pri Nabrežini. Apnenci pri Lipici kot v Cava Romana pripadajo "nabrežinskemu horizontu" zgornje krede.