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UDC 561.263:551.763.1 *Izvorni znanstveni članak*

Macroporella aptiensis n. sp. (calcareous algae; Dasycladales) from the peri-reefal Lower Aptian limestones in western Croatia

Branko SOKAČ

Institute of Geology, Sachsova 2, P. O. B. 213, YU—41000 Zagreb

Macroporella aptiensis n. sp. (family Dasycladaceae) is characterized by broad axial cavity and simple primary ramifications with aspondyle arrangement. It occurs in peri-reefal limestones of the Lower Aptian age, associated with *Korkyrella ivanovici* Sokač & Velić, numerous orbitolinas and mollusk debris.

U prigrebenskim vapnencima donjeg apta okoline Grabrka (zapadna Hrvatska) u zajednici s *Korkyrella ivanovici* Sokač & Velić učestalim orbitolinama i kršjem školjkaša nađena je vapnenačka alga prostrane aksijalne šupljine, nepodjeljenih ogranaka varijabilnog oblika i njihovog aspondilnog rasporeda. Na osnovi primarnih karakteristika opisana je *Macroporella aptiensis n. sp.*

SYSTEMATIC DESCRIPTION

Genus *Macroporella* Pia, 1912; emend. Bassoullet et al., 1978

Macroporella aptiensis n. sp.

Pls. I—II

Origin of the name: After the age of the topotype locality, which is Lower Aptian.

Type locality: Near the village Grabrk, about 200 m along the road to Trošmarija; SW of Karlovac, west Croatia.

Type stratum: Poorly bedded to massive, light brown, recrystallized floatstone with numerous pachyodont bivalves and their debrias.

Holotype: oblique section figured in Pl. I, Fig. 1, thin section GD-23/1; all the material deposited with the Institute of Geology, Zagreb.

Diagnosis: Calcareous dasyclad alga with cylindrical thallus, broad axial cavity and aspondyle arrangement of the ramifications. Ramifications simple (undivided; primaries only), varying in shape from rodlike to phloiophorous type.

Description: Cylindrical calcareous skeleton (envelope) with comparatively thin walls built up of yellowish sparry calcite. The broad axial cavity lined by smooth, regular surface, which in sections appears marked by sharp lines. This inner surface is perforated by densely spaced

tiny pores of numerous undivided ramifications, that reach the outer surface of the calcareous envelope. In their bases ramifications are very thin; they but slightly widen or swell distally, assuming a rod-like to phloiophorous shape. In the available sections the aspondyle arrangement of the ramifications is clearly visible; sometimes a slight tendency to irregular grouping of several ramifications can be seen, as e. g. in the upper part of the section figured in Pl. I, Fig. 3. The ramifications are perpendicular to the longitudinal axis or sightly inclined upwards.

Dimensions in mm:

Maximum length observed (L)	10
Outer diameter (D)	1.95—2.20
Inner diameter (d)	1.20—1.45
Length of the ramifications (l)	0.42—0.45

Similarities and differences: The new species has been included into the genus *Macroporella* on the basis of its undivided ramifications, and their shape, aspondyle arrangement and perpendicular to slightly oblique position with respect to the longitudinal axis (»main stem«). All these characteristics are in general agreement with the definition of the genus as established by Pia (1912) and adopted by Bassoullet et al. (1978). There are two stratigraphically distinct groups of species with which the new species can be compared. First, there is the group of Triassic species. *Macroporella dinarica* Pia, which is the type species of the genus, has more narrow central cavity (»main stem«), and more robust, typically phloiophorous ramifications. The same is (more or less) valid also for *M. alpina* Pia. *Macroporella beneckei* (Salom.) Pia is generally more delicate, with a broader axial cavity (amounting to about 50 % of the outer diameter) and has more densely arranged pores, that sometimes show a sligth tendency to arrange into whorls (as mentioned by Bystrický, 1964), whereas *M. aptiensis* is clearly aspondyle, generally somewhat larger and its ramifications are less oblique with relation to the main axis. *Macroporella spectabilis* Bystrický has more robust phloiophorous ramifications, arranged almost perpendicularly to the main axis and with a pronounced tendency to arrange in whorls (euspondyle). The Upper Triassic species, established by Bystrický (1967) — *Macroporella sturi* and *M. humilis* — are even more clearly euspondyle, in addition to some other less important differences.

The second group, which comprises the Upper Jurassic and Lower Cretaceous forms, can further be subdivided into two subgroups: (1) the first subgroup is composed of forms which do show an overall Macroporella-like appearance but have been included into the genus *Salpingoporella* (either by original description or by a later revision). This subgroup includes the species like *Salpingoporella tossaensis* (Yabe & Toayama), *S. sellii* (Crescenti), *S. pygmaea* (Gümbel), *S. istriana* (Gušić), *S. verticillata* (Sokač & Nikler), *S. johnsoni* (Dragastan) and the two species described by Bernier (1984) — *Salpingoporella etalloni* and *S. enayi*. All these species have typically

phloiophorous ramifications, often more or less oblique to the central axis and sometimes distally bent downward (similar as in many »true« *Macroporella* species), but with clearly euspondyle arrangement. This last feature is at the same time the difference with regard to clearly aspondyle *M. aptiensis*. — The second Jurassic-Cretaceous subgroup includes forms with markedly large and not numerous ramifications most frequently with mesospondyle to clearly euspondyle arrangement. Though they do not like any »true« (Triassic) *Macroporella*, they have been, by their authors, included into that genus: *Macroporella emebergeri* Bouroullec & Deloffre, *M. espichelensis* Deloffre & Ramalho and *Macroporella nisi* (Radoičić). All these species are mutually very similar; and while *M. embergeri* and *M. espichelensis* both have very large and apparently not typically phloiophorous ramifications (though described as possibly phloiophorous in *M. embergeri;* see Bouroullec & Deloffre, 1968), their arrangement is said to be mesospondyle in *M. embergeri* and aspondyle with euspondyle tendency in *M. espichelensis* (Deloffre & Ramalho, 1971). The third above mentioned species, *M. nisi* (Radoičić), is characterized by very few ramifications — only 4 in transversal section and, as pointed out by Radoičić (1969) in the original description, the ramifications have an euspondyle and alternating arrangement in consecutive whorls. However, the inclusion of these species *(M. embergeri, M. espichelensis* and *M. nisi),* with their characteristics as outlined above, into the genus *Macroporella* clearly shows that generic criteria have been inconsistently applied, contributing little (if anything) to the possibility of establishing consistent generic criteria which should be the decisive factor in assigning different forms to this or that genus (and which is a prerequisite for an ordened classification). Not entering into a detailed discussion bearing upon question again, the present author would only like to emphasize that the discussion published fifteen years ago by Sokač & Nikler (1973), as well as some remarks given by Sokač (1987), are still fully relevant. — With regard to *Mracroporella praturloni* Dragastan, the differences are also quite obvious, concerning a narrower central cavity, larger and more robust ramifications and their mesospondyle arrangement in *M. praturloni.*

Stratigraphic position: At its topotype locality, *Macroporella aptiensis n. sp.* occurs in peri-reefal limestones with numerous pachyodont bivalves and gastropods (either entirely preserved or in debris) and abundant foraminifera. Contrary to that, calcareous algae are found only sporadically. As the megafossil determinations have not yet been carried out, the age is defined on the basis of the following microfossil association: *Korkyrella ivanovici* Sokač & Velić, *Salpingoporella dinarica* Radoičić, *Palorbitoina lenticularis* (Blumenbach), *Praeorbitolina cormyi* Schroeder, *Sabaudia briacensis* Arnaud-Vanneau, *Quinqueloculina robusta* Neagu, *Praechrysalidina infracretacea* Luperto Sinni, *Bacinella irregularis* Radoičić, *Coptocampylodon fontis* Patrulius and others, which is, in the region concerned and taking into account the general facies characteristics, typical of the Lower Aptian.

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Macroporella aptiensis n. sp., (Dasycladaceae) iz prigrebenskog razvoja donjeg apta zapadne Hrvatske

B. Sokač

Genus *Macroporella* Pia, 1912; emend. Bassoullet et al. 1978
Macroporella aptiensis n. sp.

Podrijetlo imena: ime vrste vezano je na njezin stratigrafski položaj u topotipskom lokalitetu koji pripada donjem aptu.

Tipičan lokalitet: nalazi se nedaleko sela Grabrk udaljeno oko 200 m uz cestu prema Trošmariji JZ od Karlovca.

Tipični slojevi: nejasno slojeviti do masivni svijetlosmeđi rekristalizirani vapnenci tipa floatstone s učestalim primjercima i kršjem pahiodontnih školjkaša razvijenim u nižem dijelu apta.

Holotip: kosi presjek prikazan na Tab. I sl. 1. sadržan u preparatu pod oznakom GD-23/1. Prikazani materijal pohranjen je u Institutu za geološka istraživanja, Zagreb.

Dijagnoza: Alga se odlikuje cilindričnim talusom prostrane aksijalne šupljine i aspondilnog rasporeda ogranaka. Nepodjeljeni ogranci oblikom variraju od štapićastog do floiofornog tipa.

Opis: Cilindričan vapnenački skelet s relativno tankim stijenkama izgrađen je od žućkastog sparikalcita. Prostrana aksijalna šupljina omeđena je pravilnom površinom koja se u presjecima ocrtava oštrim linijama. Ova unutrašnja površina

gusto je perforirana sitnim porama mnogotrajnih ogranaka. Nepodijeljeni ogranci koji dosežu vanjsku površinu vapn. ovoja u bazi su vrlo tanki a distalno neznatno ili lagano odebljavaju, pa su štapićastog do floioformog izgleda. U prezentiranim presjecima jasno je uočljiv aspondilan raspored s mjestimično nejasno vidljivom nepravilnom grupacijom nekoliko ogranaka, kao što je to slučaj u gornjem dijelu presjeka prikazanog na Tab. I, sl. 3. U odnosu na uzdužnu os talusa ogranci su subvertikalni do lagano kosi prema gore.

Dimenzije su navedene u engleskom tekstu.

Sličnosti i razlike: Vrsta *Macroporella aptinensis n. sp.* pribrojena je ovom rodu na osnovi oblika nepodijeljenih ogranaka, njihovog kosog položaja u odnosu na uzdužnu os talusa te njihovog aspondilnog rasporeda što je generalno u skladu s osnovnim karakteristikama kakve je za rod *Macroporella* naveo Pia (1912), a koje su preuzeli Bassoullet et al. (1979). U odnosu na vrstu *Macroporella dinarica* Pia koja je i tipska vrsta roda razlika je prema ovdje opisanoj vrsti uočljiva u užoj matičnoj stanici te u krupnijim izrazito floioformim ograncima kod *M. dinarica*, što je približno isto i prema vrsti *Macraporella alpina* Pia. Prema vrsti *Macroporella beneckei* (Salom.) Pia 1920, koja je općenito finije građe, šire matične stanice (oko 50 % ukupnog dijametra) i s gustim porama koje pokazuju tendenciju rasporeda u pršljene kako to navodi Bystrický (1964), vrsta *M. aptiensis* diferencira se izrazitom aspondilnošću općenito nešto većim dimenzijama i manje ustrmljenim ograncima u odnosu na uzdužnu os. Razlika ove vrste uočljiva je i prema vrsti *Macroporella spectabilis* Bystrický koja se odlikuje općenito krupnijim floioformnim ograncima gotovo okomitim na uzdužnu os i s njihovim gotovo pršljenastim rasporedom. Gornjotrijaske vrste uspostavljene od Bystrickog (1967), *Macroporella sturi* Bystrický i *Macroporella humilis* Bystrický uz i druge razlike izrazitije su euspondilnog rasporeda ogranaka u odnosu na izrazito aspondilan kod *M. aptiensis.*

Gornjojurske i donjokredne forme koje je moguće ili potrebno usporediti s ovom vrstom mogu se generalno objediniti u dvije skupine: prvu koju čine forme vizuelno makroporelskih odlika, primarno ili sekundarno uvrštenih u rod *Salpingoporella,* i druga koja obuhvaća forme izrazito krupnih ogranaka, njihovog donekle uređenog do euspondilnog rasporeda, a koje su originalnim opisom ili također naknadno pribrojene rodu *Macroporella.* Prva grupa zastupana je vrstama kao što su: *Salpingoporella tosaensis* (Yabe & Toayama), *S. sellii* (Crescenti), *S. pygmaea* (Gümbel), *S. istriana* (Gušić), *S. verticillata* (Sokač & Nikler), *S. johnsoni* (Dragstan), kojima se mogu priključiti i vrste opisane od Bernier (1984), *Salpingoporella etalloni* Bernier i *S. enayi* Bernier s izrazito floiformim ograncima, često više ili manje kosim na uzdužnu os i kod pojedinih vrsta prema vani povijenim (slično s više vrsta roda *Macroporella*), ali izrazito euspondilnog rasporeda čime se već na prvi pogled oštro diferenciraju od aspondilne *M. aptiensis.* Druga grupa uključuje međusobno vrlo slične dasikladaceje: *Macroporella embergeri* Bouroullec & Deloffre, *Macroporella espichelensis* Deloffre & Ramalho koje karakteriziraju vrlo krupni i čini se ne tipični floioformni ogranci za koje se kod prve (Bouroullec & Deloffre, 1968) navodi mogući floioformni tip ogranaka mesospondilnog rasporeda, dok je kod druge (Deloffre & Ramalho, 1971) taj raspored oko centralnog kanala aspondilan s euspondilnom tendencijom. Treća, vrlo slična vrsta prethodno navedenim, *Macroporella nisi* (Radoičić) odlikuje se vrlo malim brojem ogranaka (svega 4 u poprečnom presjeku) i kako se to navodi u originalnom opisu (Radoičić, 1969) euspondilnog su i alternirajućeg rasporeda susjednih prstena. Međutim, uvrštavanje spomenute tri vrste *(M. embergeri, M. espichelensis* i *M. nisi)* u rod *Macroporella* s karakteristikama o kojima je već bilo govora upućuje na nedosljednost primjene kriterija ili barem nemogućnosti i nejasnoću uspostavljanja čvrstih koji bi bili presudni za uvrštavanje pojedinih forma u jedan ili drugi rod. Ne ulazeći ovom prilikom u daljnju analizu ili kritički osvrt validnosti kriterija smatram diskusiju navedenu u radu Sokač & Nikler (1973) kao i neke napomene dane u radu Sokač (1987) i dalje aktuelnim. Usporedba opisane vrste i vrste *Macroporella praturloni* Dragastan pokazuje također njihovu različitost izraženu užim centralnim kanalom, krupnijim ograncima i njihovim mesospondilnim rasporedom u vrste *M. praturloni.*

Stratigrafska pripadnost: *Macroporella aptiensis n. sp.* na topotipskom lokalitetu potječe iz prigrebenskih vapnenaca u kojima uz cjelovite

primjerke ili krše pahiodontnih školjkaša i puževa učestalo nalazimo različite foraminifere i tek sporadično rijetke vapnenačke alge. S obzirom da obrada školjkaša nije izvršena, definiranje stratigrafske pripadnosti osniva se na utvrđenoj zajednici u kojoj nalazimo slijedeće vrste: *Korkyrella ivanovici* Sokač & Velić, *Salpingoporella dinarica* Radoičić, *Palorbitolina lenticularis* (Blumenbach), *Praeorbitolina cormyi* Schroeder, *Sabaudia briacensis* A. Vanneau, *Quinqueloculina robusta* Neagu, *Praechrysalidina infracretacea* L. Sinni, *Bacinella irregularis* Radoičić, *Coptocampylodon fontis* Patrulius i dr., što uz opće karakteristike facijesa u ovom području determinira donji apt.

PLATE — TABLA I

1—3. *Macroporella aptiensis n. sp.*

1. Oblique section — Holotype (kosi presjek — holotip); × 2
2. Tangential section (tangencijalni presjek); × 23
3. Longitudinal — oblique section (uzdužno-kosi presjek); × 18

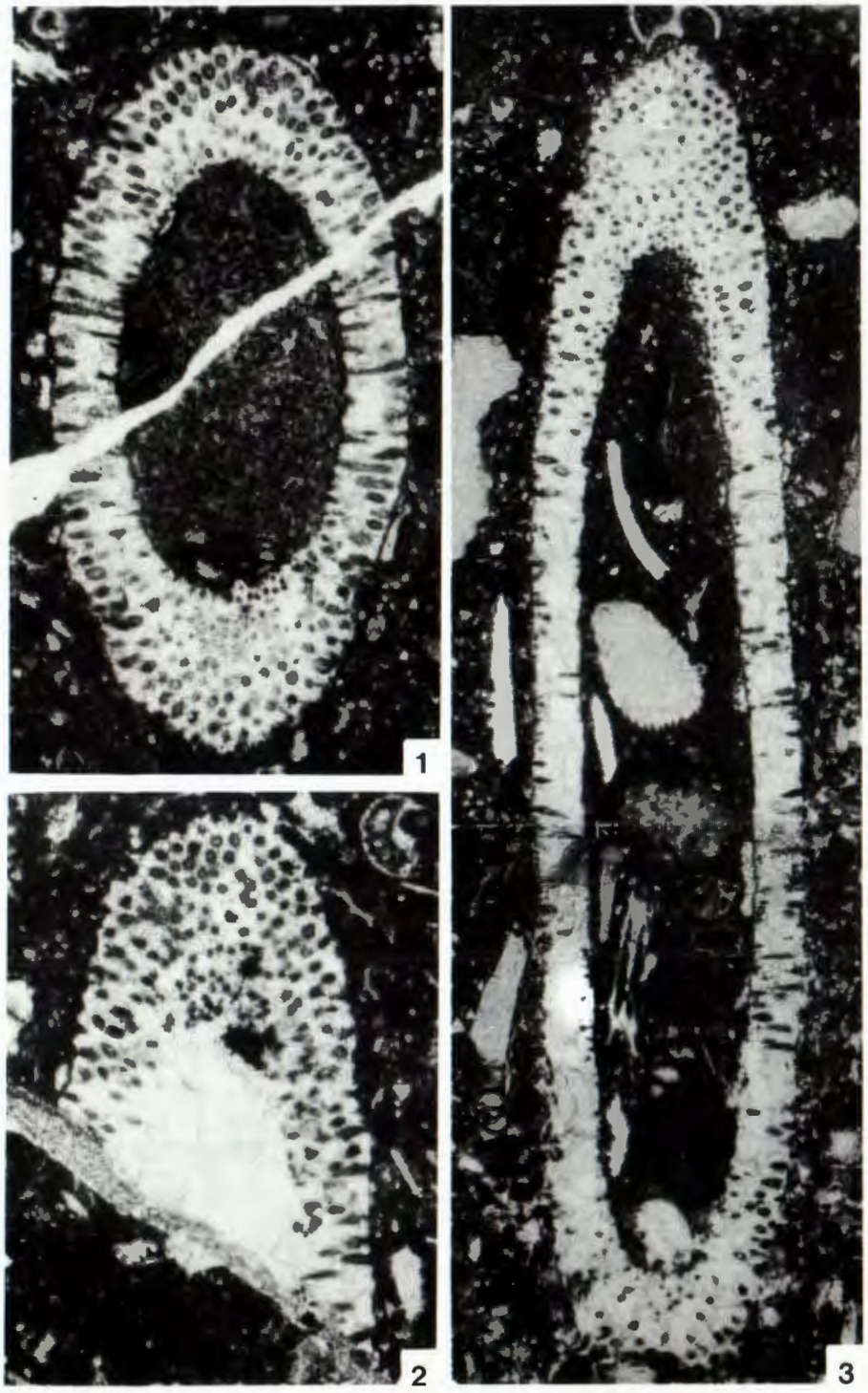
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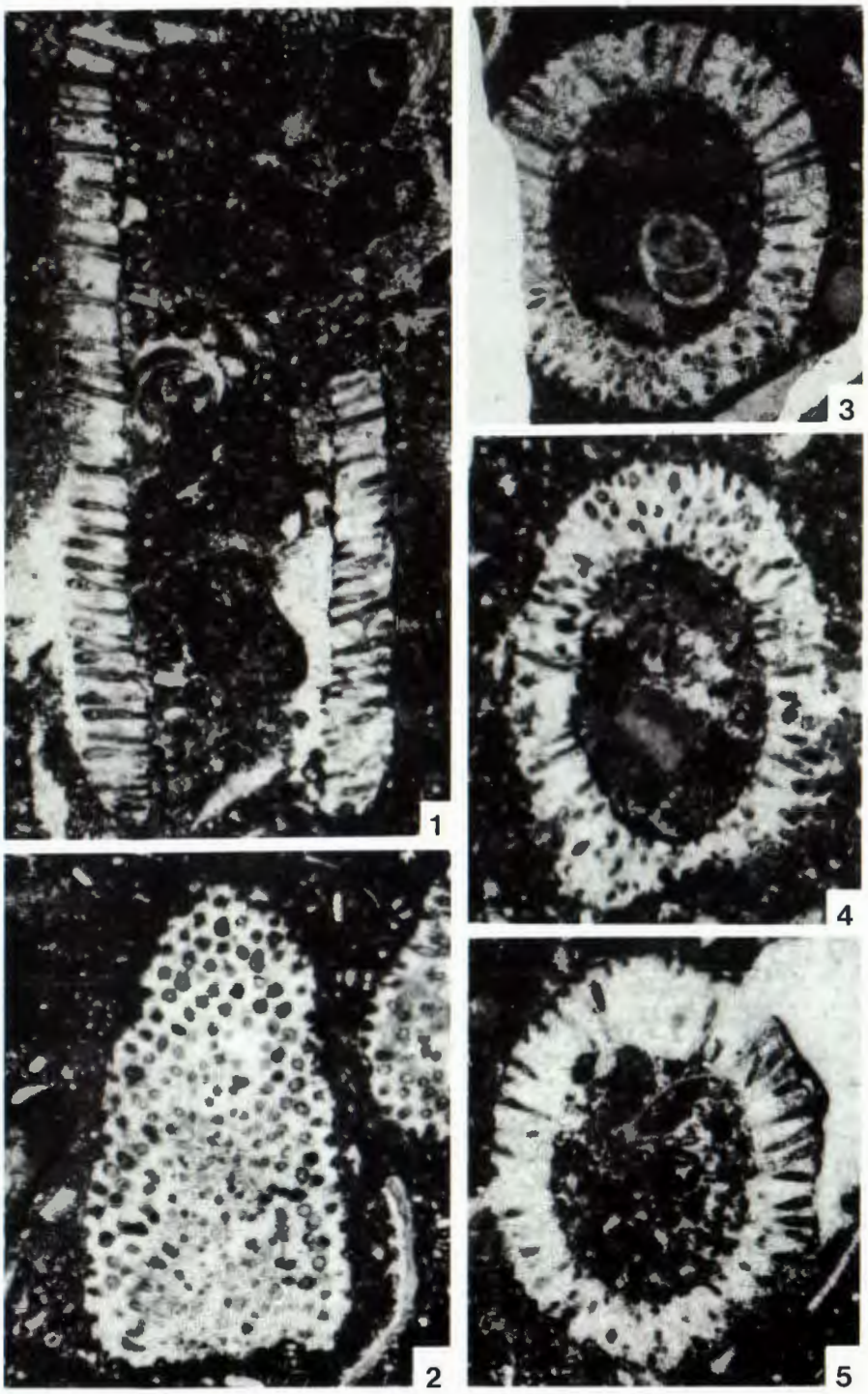
PLATE — TABLA II

1—5. *Macroporella aptiensis n. sp.*, × 23

1. Longitudinal section (uzdužni presjek)
2. Tangential section (tangencijalni presjek)
3. Cross — oblique section (poprečno-kosi presjek)

4—5. Oblique sections (kosi presjeci)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