

The new genus *Palaeocornuloculina* (Foraminiferida, Cornuspiracea) and its species from Cenomanian limestones of Southern Latium (Central Italy)

Il nuovo genere Palaeocornuloculina (Foraminiferida, Cornuspiracea) e le sue specie nei calcari cenomaniani del Lazio meridionale (Italia centrale)

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ABSTRACT - *Palaeocornuloculina* n. gen. and three new species from carbonate stratigraphic successions of Southern Latium are here described: *Palaeocornuloculina lepina* n. gen., n. sp. has been observed in the Lower Cenomanian of Lepini Mountains, *Palaeocornuloculina triangularis* n. gen., n. sp. and *Palaeocornuloculina ausonensis* n. gen., n. sp. occur respectively in the Lower Cenomanian and in the Upper Cenomanian of Ausoni Mountains.

The mentioned species are very significant for their restricted stratigraphic extension and as paleoenvironmental indicators, because they have been observed only in the inner shelf facies of Latium-Abruzzi sector of the Apennine Platform (*sensu* MERLINI & MOSTARDINI, 1986).

In the end the stratigraphic extension of the most important benthic foraminifers and calcareous algae in the Cenomanian and Lower Turonian limestones of Southern Latium is specified.

KEY WORDS: Foraminifers (Cornuspiracea), systematic, stratigraphy, paleoecology, Cenomanian, Southern Latium, Central Italy.

RIASSUNTO - Vengono descritte tre nuove specie di foraminiferi bentonici porcellanacei riferite al nuovo genere *Palaeocornuloculina*, individuate nei sedimenti carbonatici del Cretacico superiore, ampiamente affioranti nel Lazio meridionale. In particolare *Palaeocornuloculina lepina* n. gen., n. sp. proviene dal Cenomaniano inferiore dei Monti Lepini ed è caratterizzata da un guscio subcircolare biconcavo di medie dimensioni, con periferia arrotondata e 3,5-4 camere nell'ultimo giro e da una apertura singola con corto dente probabilmente semplice. *Palaeocornuloculina triangularis* n. gen., n. sp. e *Palaeocornuloculina ausonensis* n. gen., n.sp. sono state

individuate rispettivamente nel Cenomaniano inferiore e nel Cenomaniano superiore dei Monti Ausoni: la prima specie citata è caratterizzata essenzialmente da un guscio triangolare biconcavo di notevoli dimensioni, con periferia arrotondata e 3 camere per giro e da una apertura singola con dente bifido; la seconda ha un guscio triangolare biconcavo di medie dimensioni, con periferia subacuta e 3 camere per giro e una apertura singola con dente triangolare. Le tre nuove specie proposte hanno un notevole valore cronostatigrafico essendo finora note soltanto nel Cenomaniano ed inoltre risultano significative anche dal punto di vista paleoambientale essendo limitate alle facies di piattaforma carbonatica interna del settore laziale-abruzzese della Piattaforma Appenninica (*sensu* MERLINI & MOSTARDINI, 1986).

PAROLE CHIAVE: Foraminifera (Cornuspiracea), sistematica, stratigrafia, paleoecologia, Cenomaniano, Lazio meridionale, Italia centrale.

1. - INTRODUCTION

During the micropaleontological and stratigraphical researches carried out on the cretaceous carbonate limestones of Southern Latium, numerous new genera and species of benthic foraminifers were observed and partially described in former works (CHIOCCHINI & DI NAPOLI ALLIATA, 1966; CHIOCCHINI, 1984, 1988; CHIOCCHINI, 2008).

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Three new species of porcelanaceous benthic foraminifers, present in the Cenomanian of the above-mentioned area are now proposed:

Palaeocornuloculina lepina n. gen., n. sp.,
Palaeocornuloculina triangularis n. gen., n. sp. and
Palaeocornuloculina ausonensis n. gen., n. sp.

The new species can not be referred to known genera, described in the generic classification of the Foraminifera by LOEBLICH & TAPPAN, 1988: they were therefore necessarily assigned to the new taxon *Palaeocornuloculina*.

Particularly *Palaeocornuloculina lepina* n. gen., n. sp. comes from Rave Insuglio stratigraphic section, near Morolo village, North-Eastern of Lepini Mountains (Sheet 389 Anagni of the Geological Map of Italy, 1:50.000 scale); *Paleocornuloculina triangularis* n. gen., n. sp. and *Paleocornuloculina ausonensis* n. gen. n. sp. are located respectively in the middle part and in the upper part of Serra del Pruno stratigraphic section (CHIOCCHINI *et alii*, 1994) near Vallecosa village, in Central-Northern Ausoni Mountains (Sheet 159 Frosinone of the Geological Map of Italy, 1:100.000 scale) (fig. 1). These Cretaceous strati-

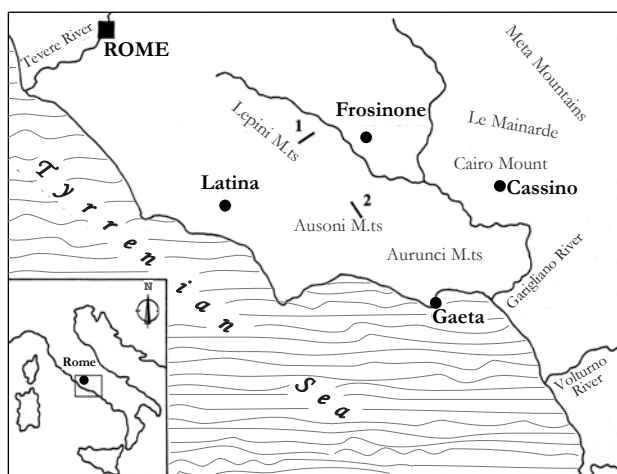


Fig. 1 - Map showing the studied area and the localization of the Rave Insuglio stratigraphic section (1) and Serra del Pruno stratigraphic section (2).

- Localizzazione dell'area studiata e delle sezioni stratigrafiche citate nel testo: sezione stratigrafica di Rave Insuglio (1) e sezione stratigrafica della Serra del Pruno (2).

graphic sections are composed by mud-supported limestones with not frequent interbedded grain-supported limestones. The sedimentation of these lithotypes is originated in the internal zone of the Latium-Abruzzi sector of the Apennine Platform (*sensu* MERLINI & MOSTARDINI, 1986), characterized by a low energy of the waters. This peculiarity is also confirmed by the biofacies, generally with rare macrofossils, but containing rich

microfossils associations prevalently composed of benthic foraminifers and calcareous algae: the most significant taxa allowed to elaborate detailed biostratigraphic schemes (CHIOCCHINI & MANCINELLI, 1977; CHIOCCHINI *et alii*, 1994, CHIOCCHINI *et alii*, 2008), valid for the mesozoic carbonate facies of the Central Apennines.

The three new species, here proposed, result very important, for their restricted stratigraphic extension, for the cretaceous microbiostratigraphy regarding the inner carbonate platform facies of Southern Latium.

2. - SYSTEMATIC DESCRIPTION

ORDER Foraminiferida EICHWALD, 1830

SUBORDER Miliolina DELAGE & HEROUARD, 1896

SUPERFAMILY Cornuspiracea SCHULTZ, 1854

FAMILY ? Ophthalmitidae WIESNER, 1920

GENUS *Palaeocornuloculina* n. gen.

TYPE-SPECIES *Palaeocornuloculina triangularis* n. sp.

ORIGIN OF THE NAME: the generic name shows the likeness with holocenic genus *Cornuloculina* BURBACH, 1886 by the presence of an initial rather reduced cornuspirine stage.

DIAGNOSIS: test free, laterally compressed, biconvex, triangular to subcircular in outline, with rounded to subacute periphery and planispiral evolute coiling. Globular proloculus is followed by a cornuspirine second chamber of 1-1.5 whorls; the last stage is composed by 3-5 whorls, with 3-3.5 narrow and long chambers per whorl, showing a more or less rounded edge. The chambers can be larger than those of the former whorls presence of the floors particularly clear in the chambers of the last whorls.

Wall calcareous, imperforate, porcelanaceous; aperture single at the end of the chambers with simple or bifid tooth. Cenomanian; Central Italy.

REMARKS: the attribution of the new genus to the family Ophthalmitidae WIESNER, 1920 is uncertain because in the foraminiferal classification by LOEBLICH & TAPPAN, 1988 it is specified that the final stage chambers "commonly are one-half coil in length".

SIMILARITIES AND DIFFERENCES: *Palaeocornuloculina* n. gen. differs from *Cornuloculina* BURBACH, 1886 because the last genus is characterized by carinate peripheral margin, by a well developed cornuspirine stage composed at the end of 3 whorls, by

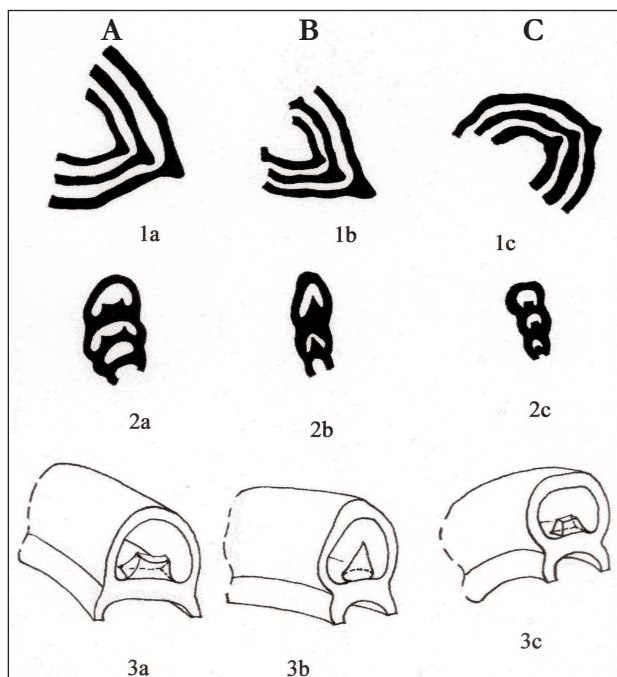


Fig. 2 - Shape of the apertural tooth: A - *Palaeocornuloculina triangularis* n. gen., n. sp.; B - *Palaeocornuloculina ausonensis* n. gen., n. sp.; C - *Palaeocornuloculina lepina* n. gen., n. sp.; 1a, 1b, 1c - partial equatorial sections; 2a, 2b, 2c - partial transverse sections; 3a, 3b, 3c - hypothetical partial reconstructions of one chamber with apertural tooth.

- *Forma del dente aperturale*: A - *Palaeocornuloculina triangularis* n. gen., n. sp.; B - *Palaeocornuloculina ausonensis* n. gen., n. sp.; C - *Palaeocornuloculina lepina* n. gen., n. sp.; 1a, 1b, 1c - *sezioni equatoriali parziali*; 2a, 2b, 2c - *sezioni trasversali parziali*; 3a, 3b, 3c - *ricostruzioni ipotetiche parziali di una camera con dente aperturale*.

the number of the chambers in the last stage not superior to 3 per whorl, by lack of floors, by a thin solid plate that separates the chambers lumen of the successive whorls and also by a slit-like aperture, lacking a tooth.

***Palaeocornuloculina triangularis* n. sp.**

figure 2A; plate I - figures 1-9; plate II - figures 1-9; plate III - figures 1-9

1973/74 *Spiroloculina* sp. - RADOIČIĆ, plate 4, figure 3.
1975 Miliolidae - CHRISTODOULOU & TSAILA-MONOPOLIS, plate 57 - figure 1 (on the right).

ORIGIN OF THE NAME: after the triangular shape of the test.

HOLOTYPE: equatorial section of the specimen illustrated in plate I - figure 1 (sample A. 1254) deposited in the micropaleontological collection of the Department of Earth Sciences, University of Camerino, Central Italy.

PARATYPES: different oriented sections illustrated

in plate I - figures 2, 3, 4 (above); plate II - figures 1, 2, 4, 5, 7, 9; plate III - figures 3, 4, 5, 8 (right), 9 (above) (samples A. 1250, A. 1251, A. 1253, A. 1255, A. 1256) deposited in the micropaleontological collection of above-mentioned Department of Earth Sciences.

TYPE-LOCALITY: middle part of Serra del Pruno stratigraphic section outcropping on the eastern side of the namesake ridge, near Vallecorsa village, Ausoni Mts., Southern Latium, Central Italy (fig. 3).

TYPE-LEVEL: Lower Cenomanian grain-supported limestone with frequent porcelanaceous benthic foraminifers.

MATERIAL: lower than 100 differently oriented sections from the type-level.

SPECIFIC DIAGNOSIS: *Palaeocornuloculina* characterized by large dimensions, triangular test with rounded periphery and 3 chambers per whorl in the last stage, where the last chambers are alternately arranged a little under and above the equatorial plane and by an aperture with a large bifid tooth.

DESCRIPTION: text triangular in outline, laterally biconcave with flattened periphery and a planispiral evolute coiling. The globular proloculus, of 0.040-0.060 mm in diameter, lies in the centre of the equatorial plane and is followed by early reduced cornuspirine stage composed of a little bit more than one whorl. The last stage is made up of 4-5 whorls, each with 3 chambers very lengthened on the equatorial plane: these chambers, considerably higher than broad, are arranged to form an equilateral triangle with slightly convex sides towards the outside of the test. The chambers of the early whorls increase regularly in dimensions as added, while the chambers of the two last whorls are bigger than the former: they are alternatively arranged a little under and above the equatorial plane and show a characteristic sigmoid path, as seen in some axial sections.

Wall calcareous, imperforate, porcelanaceous, consisting of a single layer thickened in the inner part of the test, due to the superimposition of one chamber floor on the roof of the previous one. Aperture single at the end of each chamber, with a large, wedge-shaped and bifid tooth (fig. 2A).

BIOMETRICAL PARAMETERS:

proloculus diameter 0.04 - 0.06 mm

max diameter of the test 0.52 - 1.26 mm (more

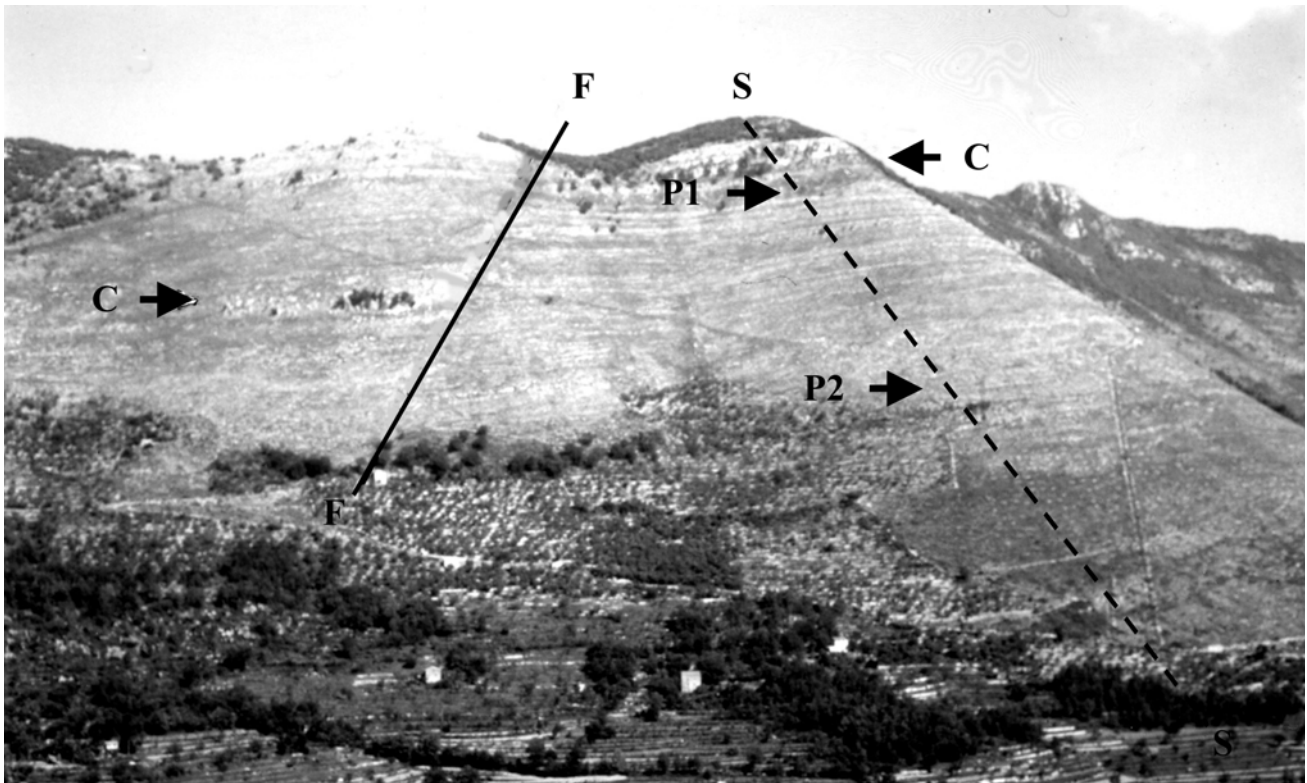


Fig. 3 - The eastern flank of Serra del Pruno ridge (Ausoni Mts., Southern Latium) seen from Vallecorsa village: F-F) normal fault; S-S) trace of the homonymous stratigraphic section; C) *Cisalveolina fraasi* biohorizon; P1) position of the *Palaeocornuloculina ausonensis* n. gen., n. sp. type-level; P2) position of the *Palaeocornuloculina triangularis* n. gen., n. sp. type-level.
 - Versante orientale del rilievo della Serra del Pruno visto dal paese di Vallecorsa: F-F) faglia normale; S-S) traccia dell'omonima sezione stratigrafica; C) bioorizzonte a *Cisalveolina fraasi*; posizione dei livelli-tipo di *Palaeocornuloculina ausonensis* n. gen., n. sp. (P1) e *Palaeocornuloculina triangularis* n. gen., n. sp. (P2).

frequent 0.86 – 0.92 mm)
 number of whorls in the early cornuspirine stage
 a little more 1
 number of whorls in the last stage 4 – 5
 number of the chambers per whorl in the last stage 3
 length of the chambers in the last whorl 0.5 – 0.7 mm
 early whorls 0.026 – 0.045 mm
 height of the chambers
 last two whorls 0.051 – 0.093 mm
 early whorl 0.04 – 0.12 mm
 width of the chambers
 last two whorls 0.146 – 0.345 mm

SIMILARITIES AND DIFFERENCES: *Palaeocornuloculina triangularis* n. gen., n. sp. and *Palaeocornuloculina ausonensis* n. gen., n. sp. are similar for the triangular outside of the test, with 3 chambers per whorl in the last stage. The first species differs from the second one in the greater general dimensions and rounded periphery of the test, in the chambers of the last whorls considerably greater than the previous ones: these chambers are also much wider than high.

The two considered species show a similar aper-

ture in shape and position, but differ for the presence of a large, wedge-shape and bifid tooth in *Palaeocornuloculina triangularis* n. gen., n. sp., while the aperture in *Palaeocornuloculina ausonensis* n. gen., n. sp. is characterized by a conical tooth. *Palaeocornuloculina triangularis* n. gen., n. sp. is considerably different from *Palaeocornuloculina lepina* n. gen., n. sp. because the latter shows a subcircular outside and 3.5 – 4 chambers in the last whorl of the test. Besides, the general dimensions of *Palaeocornuloculina triangularis* n. gen., n. sp. are bigger than those of *Palaeocornuloculina lepina* n. gen., n. sp., with the chambers of the last whorls much greater than the previous ones (tab. 1). The apertures are similar in shape and position in the two mentioned species, but differ for the shape of the tooth: large, wedge-shape and bifid in *Palaeocornuloculina triangularis* n. gen., n. sp., equally wedge-shape but shorter and probably simple in *Palaeocornuloculina lepina* n. gen., n. sp.

PALAEONTOLOGICAL ASSOCIATION OF THE TYPE-LEVEL: *Palaeocornuloculina triangularis* n. gen., n. sp. is associated with *Nezzazata simplex* OMARA, *Biconcava bentori* HAMAOUÏ & SAINT-MARC,

Nummuloculina regularis PHILIPPSON, *Spiroloculina cenomana* CHIOCCHINI, *Ovalveolina maccagnoae* DE CASTRO, *Cuneolina* sp., *Palaeosigmoilopsis apenninica* CHIOCCHINI, frequent Miliolidae and *Thaumatoporella parvovesiculifera* (RAINERI).

STRATIGRAPHICAL EXTENSION: the new species is known only from the Lower Cenomanian of the type-locality, where is localized in the upper part Ostracoda and Miliolidae biozone).

DEPOSITIONAL ENVIRONMENT: internal zone of the Latium-Abruzzi carbonate platform.

***Palaeocornuloculina ausonensis* n. sp.**
figure 2B; plate IV - figures 1-15

ORIGIN OF THE NAME: shows the provenance of the new species from Ausoni Mts., Southern Latium, Central Italy.

HOLOTYPE: equatorial section of the specimen

Tab. 1 - Comparison between the most significant biometric parameters for *Palaeocornuloculina triangularis* n. gen., n. sp., *Palaeocornuloculina ausonensis* n. gen., n. sp. and *Palaeocornuloculina lepina* n. gen., n. sp. - Confronto tra i più significativi parametri biometrici di *Palaeocornuloculina triangularis* n. gen., n. sp., *Palaeocornuloculina ausoniensis* n. gen., n. sp. e *Palaeocornuloculina lepina* n. gen., n. sp.

Biometrical parameters	<i>Palaeocornuloculina triangularis</i> n. sp.	<i>Palaeocornuloculina ausonensis</i> n. sp.	<i>Palaeocornuloculina lepina</i> n. sp.
proloculus diameter	0.04 - 0.06 mm	0.024 - 0.045 mm	0.035 - 0.040 mm
max diameter of the test	0.52 - 1.26 mm	0.30 - 0.72 mm	0.46 - 0.80 mm
numbers of the whorls in the cornuspirine stage	about 1	1 - 1.2	1 - 1.5
number of the whorls in the last stage	4 - 5	3 - 4	3 - 5
number of the chambers in a single whorl of the last stage	3	3	early whorls 3 last whorl 3.5 - 4
length of the chambers in the last whorl	0.50 - 0.70 mm	0.33 - 0.53 mm	0.22 - 0.50 mm
height of the chambers	early whorls 0.026 - 0.045 mm last tow whorls 0.051 - 0.093 mm	early whorls 0.033 - 0.080 mm last tow whorls 0.086 - 0.133 mm	early whorls 0.026 - 0.045 mm last tow whorls 0.050 - 0.100 mm
width of the chambers	early whorls 0.040 - 0.120 mm last two whorls 0.146 - 0.345 mm	early whorls 0.025 - 0.040 mm last tow whorls 0.080 - 0.118 mm	early whorls 0.033 - 0.066 mm last tow whorls 0.100 - 0.210 mm

illustrated in plate IV - figure 1 (sample A.1727) deposited in the micropaleontological collection of the Department of Earth Sciences, University of Camerino, Central Italy.

PARATYPES: different oriented sections illustrated in plate IV - figures 3, 7, 8, 12, 13, 14 (samples A.1729, A.1730, A.1732) deposited in the micropaleontological collection of the above-mentioned Department of Earth Sciences.

TYPE-LOCALITY: upper part of Serra del Pruno stratigraphic section, outcropping on the eastern side of the namesake ridge, near Vallecorsa village, Ausoni Mts., Southern Latium, Central Italy (fig. 4).

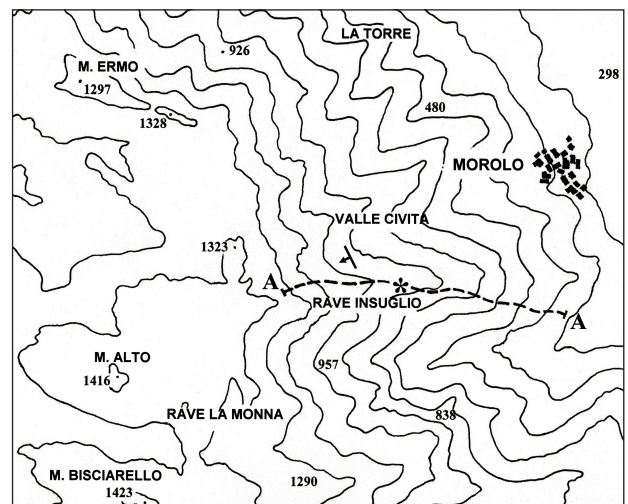


Fig. 4 - Partial reproduction of Sheet 389 Anagni, Map of Italy 1:50.000 scale: the dashed line A-A shows the trace of the Rave Insuglio stratigraphic section; * indicates the position of the *Palaeocornuloculina lepina* n. gen., n. sp. type-level.

- Riproduzione parziale del Foglio 389 Anagni della Carta d'Italia, scala 1:50.000: A - A tracciato della sezione stratigrafica di Rave Insuglio; * indica la posizione dello strato-tipo di *Palaeocornuloculina lepina* n. gen., n. sp.

TYPE-LEVEL: Upper Cenomanian grain-supported limestone with frequent benthic foraminifers.

MATERIAL: about 50 different oriented sections from the type-level.

SPECIFIC DIAGNOSIS: *Palaeocornuloculina* characterized by middle dimensions, triangular and bilaterally rather compressed test with subacute periphery, chambers of the last whorl regularly increasing as added and by an aperture with conical tooth.

DESCRIPTION: test characterized by middle dimensions, triangular in outline, laterally com-

pressed and biconcave, with subacute periphery and planispiral evolute coiling. The globular proloculus, 0.025-0.045 mm in diameter, lies in the centre of the equatorial plane and is followed by a cornuspirine early stage reduced a little bit more than one whorl. The last stage is made up of 3-4 whorls each with 3 chambers very lengthened on the equatorial plane and arranged to form an equilateral triangle with lightly convex sides towards the outside of the test. The chambers of the last stage, generally higher than broad, increase regularly in dimension as are added.

Wall calcareous, imperforate, porcelanaceous, consisting of a single layer thickening in the inner part of the test, due the superimposition of one chamber floor on the roof of the previous one. Aperture single at the end of each chamber, with a conical tooth (fig. 2B).

BIOMETRICAL PARAMETERS:

proloculus diameter 0.024 – 0.045 mm

max diameter of the test 0.30 – 0.72 mm

number of whorls in the early cornuspirine stage 1 – 1.2

number of whorls in the last stage 3 - 4

number of the chambers per whorl in the last stage 3

length of the chambers in the last whorl 0.33 – 0.53 mm

early whorl 0.033 – 0.08 mm

height of the chambers

last two whorls 0.086 – 0.133 mm

early whorl 0.025 – 0.04 mm

width of the chambers

last two whorls 0.08 – 0.118 mm

SIMILARITIES AND DIFFERENCES:

Palaeocornuloculina ausonensis n. gen., n. sp. and *Palaeocornuloculina triangularis* n. sp. are similar for the triangular outside of the test, with 3 chambers per whorl in the last stage. The first species differs from the second one in the test more compressed in axial direction with subacute periphery, by smaller general dimensions and in its chambers higher than wide in the last whorl. The two species show a similar aperture, but in *Palaeocornuloculina ausonensis* n. gen., n. sp. the aperture is characterized by a conical tooth, while *Palaeocornuloculina triangularis* n. gen., n. sp. has a large, wedge-shape and bifid tooth.

Palaeocornuloculina ausonensis n. gen., n. sp. is considerably different from *Palaeocornuloculina lepina* n. gen., n. sp. because the latter is characterized by a subcircular outside, with 3.5-4 higher than wide chambers in the last whorl. The aperture in the two considered species is similar in shape and

position, but in *Palaeocornuloculina ausonensis* n. gen., n. sp. it is characterized by a conical tooth, while in *Palaeocornuloculina lepina* n. gen., n. sp. the aperture shows a short, wedge-shape and probably simple tooth.

PALAEONTOLOGICAL ASSOCIATION OF THE TYPE-LEVEL: *Palaeocornuloculina ausonensis* n. sp. is associated with *Pseudorbapydionina dubia* (DE CASTRO), *Pseudolituonella reicheli* MARIE, *Nezazatinella* cf. *aegyptiaca* SAID & KENAWY, *Vidalina radoicicae* CHERCHI & SCHROEDER, *Discorbis* cf. *minutus* SAID & KENAWY, *Peneroplis* cf. *turonicus* SAID & KENAWY and rare Miliolidae.

STRATIGRAPHICAL EXTENSION: the new species has been observed only in the uppermost Cenomanian of the type-locality, where is localized approximately 15 meters below the first occurrence of *Cisalveolina fraasi* (GÜMBEL) (lower part of *Chrysalidina gradata* and *Pseudolituonella reicheli* biozone).

DEPOSITIONAL ENVIRONMENT: internal zone of the Latium-Abruzzi carbonate platform.

Palaeocornuloculina lepina n. sp.

figure 2C; plate V - figures 1-12

ORIGIN OF THE NAME: shows the provenance of the new species from Lepini Mts., Southern Latium, Central Italy.

HOLOTYPE: equatorial section of the specimen illustrated in plate V - figure 1 (sample A. 94) deposited in the micropaleontological collection of the Department of Earth Sciences, University of Camerino, Central Italy.

PARATYPES: sections with different orientation illustrated in plate V - figures 2, 4, 5, 7, 10, 11, 12 (samples A. 94, A. 95, A. 97), deposited in the micropaleontological collection of the above-mentioned Department of Earth Sciences.

TYPE-LOCALITY: middle part of the Rave Insuglio stratigraphic section near Morolo village, Eastern Lepini Mts., Southern Latium, Central Italy (fig. 4).

TYPE-LEVEL: Lower Cenomanian mud-supported fenestral limestone with *Sellialveolina viallii* and other porcelanaceous benthic foraminifers.

MATERIAL: about 25 specimens in variously oriented sections from the type-level and some sections from other localities of the Lepini Mts.

SPECIFIC DIAGNOSIS: *Palaeocornuloculina* characterized by middle dimensions and the subcircular test with rounded periphery, 3 chambers per whorl in the early stage and 3.5-4 chambers in the last whorl, by an aperture with a short and probably simple tooth.

DESCRIPTION: test characterized by middle dimensions, subcircular in outline, laterally biconcave with inflated periphery and with planispiral evolute coiling. The globular proloculus, 0.035-0.040 mm in diameter, lies in the centre of the equatorial plane and is followed by early reduced cornuspirine stage composed of 1-1.5 whorls. The last stage is made up by 3-5 whorls, each initially with 3 chambers per whorl, tending to form an equilateral triangle on the equatorial plane; the last whorls are composed of 3.5-4 semicircular chambers each: these chambers are very lengthened on the equatorial plane and convexes towards the outside of the test: they increase regularly in length as are added, resulting wider than high. The chambers of the last whorl are alternately arranged a little under and below the equatorial plane and show a characteristic sigmoid path, as seen in some longitudinal-axial sections.

Wall calcareous, imperforate, porcelanaceous, consisting of a single layer thickened in the inner part of the test, due the superimposition of one chamber floor on the roof of the previous one. Aperture single at the end of the final chamber, with a short, wedge-shaped and probably simple tooth (fig. 2C).

BIOMETRICAL PARAMETERS:

proloculus outer diameter 0.035 – 0.040 mm

max diameter of the test 0.46 – 0.80 mm

number of whorls in early cornuspirine stage 1 – 1.5

number of whorls in the last stage 3 - 5

early whorls 3

number of chambers per whorl in the last stage

last whorls 3.5-4

length of chambers in the last whorl 0.22 – 0.50 mm

early whorl 0.026 – 0.045 mm

height of chambers in the last stage

last whorls 0.05 - 0.10 mm

early whorl 0.033 – 0.066 mm

width of chambers in the last stage

last whorls 0.10 – 0.21 mm

SIMILARITIES AND DIFFERENCES: *Palaeocornuloculina lepina* n. gen., n. sp. differs considerably from the other two species referred to the same genus for

the subcircular outline of the test and for the last whorl, composed by 3.5-4 long and curved chambers. *Palaeocornuloculina lepina* n. gen., n. sp. is similar to *Palaeocornuloculina triangularis* n. gen., n. sp. for the inflated periphery of the test, but it is very different from *Palaeocornuloculina ausonensis* n. gen. n. sp., which shows a subacute periphery. The examined species is similar to *Palaeocornuloculina ausonensis* n. gen., n. sp. for the general dimensions of the test, while it is considerably smaller than *Palaeocornuloculina triangularis* n. gen., n. sp. The apertural characters of the above-mentioned species are also similar except for the form of the tooth: short, wedge-shaped and probably simple in *Palaeocornuloculina lepina* n. gen., n. sp., large, wedge-shaped and bifid in *Palaeocornuloculina triangularis* n. gen., n. sp., conic in *Palaeocornuloculina ausonensis* n. gen., n. sp.

PALAEONTOLOGICAL ASSOCIATION OF THE TYPE-LEVEL: *Palaeocornuloculina lepina* n. gen., n. sp. is associated with *Sellialveolina viallii* COLALONGO, *Spiroloculina cenomana* CHIOCCHINI, *Palaeosigmoilopsis apenninica* CHIOCCHINI, *Nezzazata simplex* OMARA, *Biconcava bentori* HAMAOUÏ & SAINT-MARC, *Cuneolina* sp., miliolids and ostracods.

STRATIGRAPHICAL EXTENSION: the new species has been observed in the Lower Cenomanian of the type-locality and in numerous other successions of Lepini Mts., everywhere associated to *Sellialveolina viallii* (upper part of the Ostracoda and Miliolidae biozone).

DEPOSITIONAL ENVIRONMENT: internal zone of the Latium-Abruzzi carbonate platform.

3. - CONCLUSIONS

The new described taxa of superfamily Miliolacea seem to have a restricted stratigraphic extension having been observed, in type-localities, only in cenomanian limestones: these new species can be therefore added to the numerous typical benthic foraminifers and calcareous algae used for the biostratigraphy of the Cenomanian in Central-Southern Apennines (tab. 2).

Palaeocornuloculina triangularis n. gen., n. sp., *Palaeocornuloculina ausonensis* n. gen., n. sp. and *Palaeocornuloculina lepina* n. gen., n. sp. are probably important also as paleoenvironmental indicators in that their presence, in the studied area, seems to be at the moment restricted only to the carbonatic sediments of the inner shelf facies.

Table 2 - Range-chart of the most significant microfossils (foraminifers and calcareous algae) in the Cenomanian and Lower Turonian of the inner carbonate platform in Southern Latium, Central Italy. Biostratigraphic and chronostratigraphic references from CHIOCCHINI et alii, 1994; CHIOCCHINI et alii, 2008.

- Carta di distribuzione dei microfossili più significativi (foraminiferi e alghe calcaree) nel Cenomaniano e Turoniano inferiore della piattaforma carbonatica interna nel Lazio meridionale. Riferimenti bio - cronostratigrafici da CHIOCCHINI et alii, 1994; CHIOCCHINI et alii, 2008.

AGE	CENOMANIAN			TURONIAN p.p.
	Early	Late		Early
BIOZONES (from CHIOCCHINI et alii, 2005)	Ostracoda and Miliolidae	P. dubia and P. laurinensis	C. gradata and P. reicheli	N. cf. aegyptiaca and N. cf. irregularis
? Fischerina carinata	←			
Valdanchella decourti	←			
Ovalveolina crassa	←			
Neoiragia insolita	←			
Sigmomassilina ottadunensis	—	—		
Nezazata simplex	—	—		
Ovalveolina maccagnoe	—			
Palaeocornuloculina triangularis	—			
Cuneolina sp.	—			
Nummoloculina regularis	—			
Palaeosigmoilopsis apenninica	—	—		
Spiroloculina cenomana	—	—		
Vidalina radoicicae	—	—		
Biconcava bentori	—	—		
Palaeocornuloculina lepina	—			
Selliaveolina viallii	—			
O. (Conicorbitolina) conica		—		
Merlingina cretacea		—		
Trochospira animelechi		—		
Biplanata peneropliformis		—		
Praealveolina aff. tenuis		—		
Cisalveolina lehneri		—		
Trocholina cf. arabica		—		
Cuneolina pavonia		—		
Marssonella turris		—		
Murgeina apula		—		
Nezazata gyra		—		
Heteroporella lepina		—		—
Nezazata conica		—		
Rotalia mesogeensis		—		
Pyrgo globulosa		—		
Pseudorbipyridionina laurinensis		—		
Pseudorbipyridionina dubia		—		
Peneroplis cairensis		—		
? Pseudorbipyridionina anglonensis		—		
Peneroplis cf. turonicus		—		
Discorbis cf. minutus		—		→
Pseudolituonella reicheli		—		→
Nezazatinella cf. aegyptiaca		—		→
Chrysalidina gradata		—		→
Palaeocornuloculina ausonensis		—		
Cisalveolina fraasi		—		
Discorbis cf. turonicus		—		→
Pseudorbipyridionina murgiana		—		
Cocites zubairensis		—		
Permocalculus irenae		—		
Aeolisaccus barattoloi		—		→
Lituolidae sp. ind. 2		—		→
Nummoloculina cf. irregularis		—		→

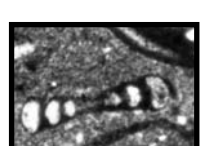
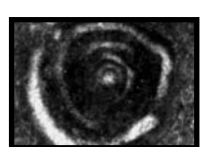
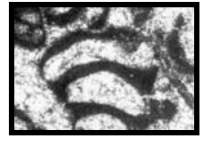
Acknowledgments

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PLATE I

Figs. 1-9 - *Palaeocornuloculina triangularis* n. gen., n. sp. x 75

Fig. 1 - equatorial section, holotype;

fig. 2 - subaxial section, paratype;

fig. 3 - transverse oblique section, paratype;

fig. 4 - bottom subaxial sections; top equatorial section, paratype;

fig. 5 - axial section;

fig. 6 - subaxial sections;

figs. 7, 9 - equatorial sections;

fig. 8 - transverse oblique section.

All figures from the type-locality, middle part of Serra del Pruno stratigraphic section (Ausoni Mts., Southern Latium), Lower Cenomanian.

TAVOLA I

Figg. 1-9 *Palaeocornuloculina triangularis* n. gen., n. sp. x 75

Fig. 1 - sezione equatoriale, olotipo;

fig. 2 - sezione subassiale, paratipo;

fig. 3 - sezione trasversale obliqua, paratipo;

fig. 4 - in basso sezioni subassiali; in alto sezione equatoriale, paratipo;

fig. 5 - sezione assiale;

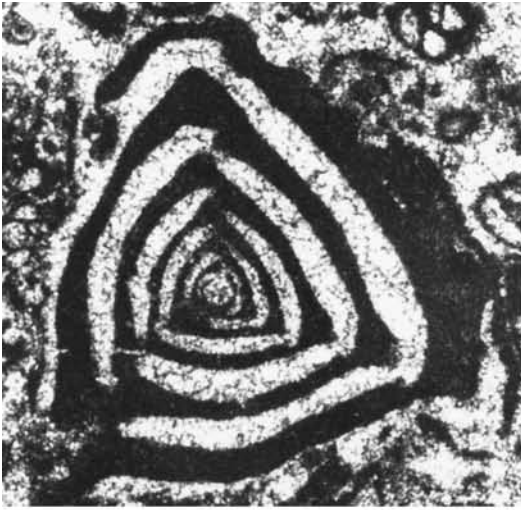
fig. 6 - sezioni subassiali;

figg. 7, 9 - sezioni equatoriali;

fig. 8 - sezione trasversale obliqua.

Tutte le figure dalla località-tipo, parte media della sezione stratigrafica della Serra del Pruno (Monti Ausoni, Lazio meridionale), Cenomaniano inferiore.

Plate I



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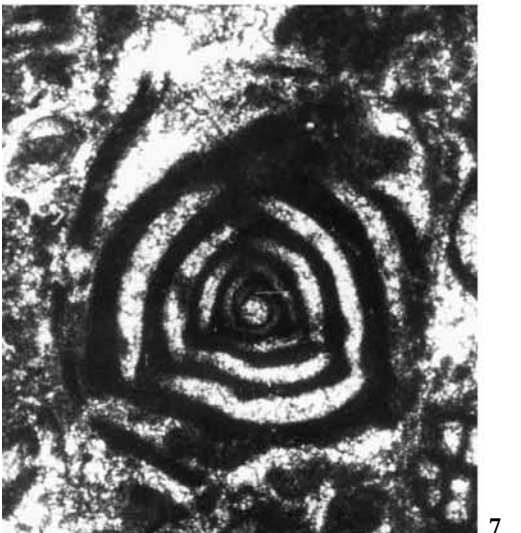
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PLATE II

Figs. 1-9 - *Palaeocornuloculina triangularis* n. gen., n. sp. x 75

fig. 1, 2, 9 - equatorial sections, paratypes;

fig. 3 - equatorial section;

figs. 4, 7 - subaxial sections, paratypes;

fig. 5 - axial section, paratype;

fig. 6 - subaxial section;

fig. 8 - transverse oblique section.

All figures from the type-locality, middle part of Serra del Pruno stratigraphic section (Ausoni Mts., Southern Latium), Lower Cenomanian.

TAVOLA II

Figg. 1-9 - *Palaeocornuloculina triangularis* n. gen., n. sp. x 75

Figg. 1, 2, 9 - sezioni equatoriali, paratipi;

fig. 3 - sezione equatoriale;

figg. 4, 7 - sezioni subassiali, paratipi;

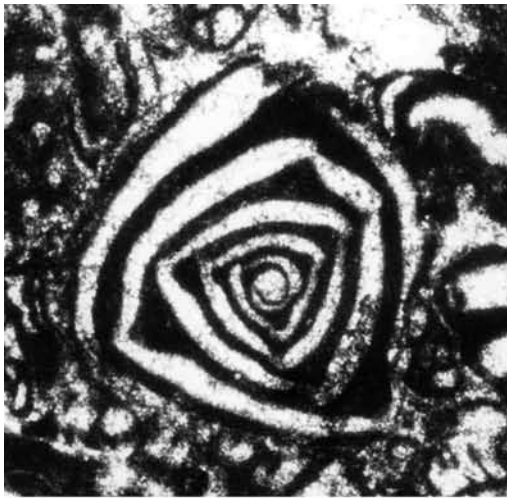
fig. 5 - sezione assiale, paratipo;

fig. 6 - sezione subassiale;

fig. 8 - sezione trasversale obliqua.

Tutte le figure dalla località-tipo, parte media della sezione stratigrafica della Serra del Pruno (Monti Ausoni, Lazio meridionale), Cenomaniano inferiore.

Plate II



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PLATE III

Figs. 1-9 - *Palaeocornuloculina triangularis* n. gen., n. sp. x 75

Figs. 1, 6 - equatorial sections;

figs. 2, 7 - bottom subaxial sections;

figs. 3, 4 - subaxial sections, paratypes;

fig. 5 - equatorial section, paratype;

fig. 8 - right axial sections, paratypes; left transverse oblique section;

fig. 9 - bottom subaxial sections; top axial sections, paratypes.

All figures from the type-locality, upper part of Serra del Pruno stratigraphic section (Ausoni Mts., Southern Latium), Lower Cenomanian.

TAVOLA III

Figg. 1-9 - *Palaeocornuloculina triangularis* n. gen., n. sp. x 75

Figg. 1, 6 - sezioni equatoriali;

Figg. 2, 7 - in basso, sezioni subassiali;

Figg. 3, 4 - sezioni subassiali, paratipi;

Fig. 5 - sezione equatoriale, paratipo;

Figg. 8 - a destra sezioni assiali, paratipi; a sinistra sezione trasversale obliqua.

Fig. 9 - in basso, sezioni subassiali; in alto sezioni assiali, paratipi.

Tutte le figure dalla località-tipo, parte superiore della sezione stratigrafica della Serra del Pruno (Monti Ausoni, Lazio meridionale), Cenomaniano inferiore.

Plate III



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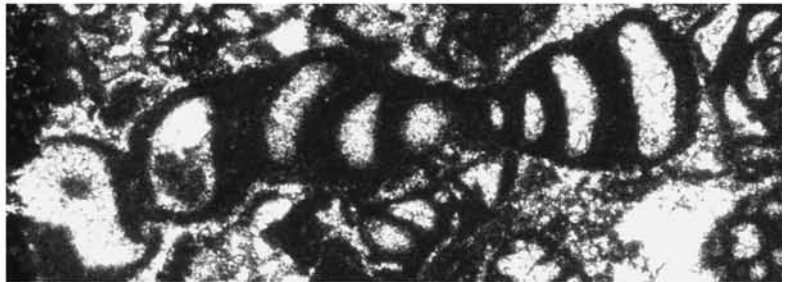
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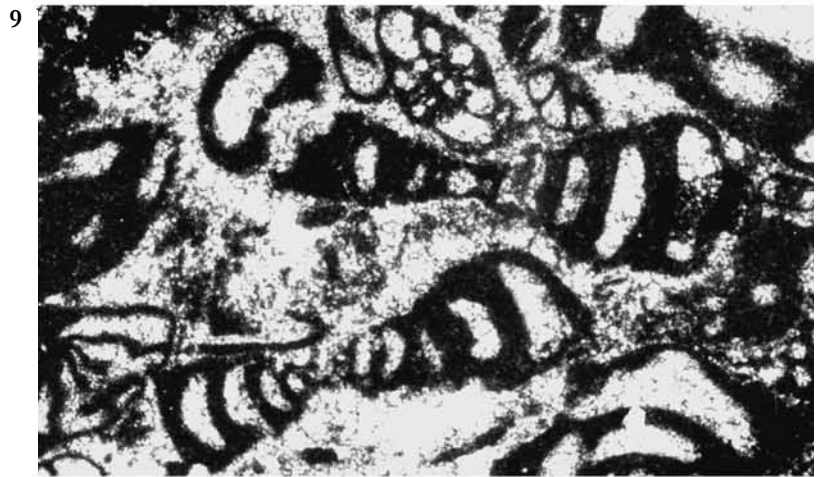
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PLATE IV

Figs. 1-15 - *Palaeocornuloculina ausonensis* n. gen., n. sp. x 75

- Fig. 1** - equatorial section, holotype;
figg. 2, 10, 15 - partial subequatorial sections;
fig. 3 - equatorial section, paratype;
fig. 4 - subaxial section;
figg. 5, 6, 11 - equatorial sections;
figg. 7, 8, 12, 14 - subaxial sections, paratypes;
fig. 9 - transverse oblique section;
fig. 13 - axial section, paratype.

All figures from the type-locality, upper part of Serra del Pruno stratigraphic section (Ausoni Mts., Southern Latium), Upper Cenomanian.

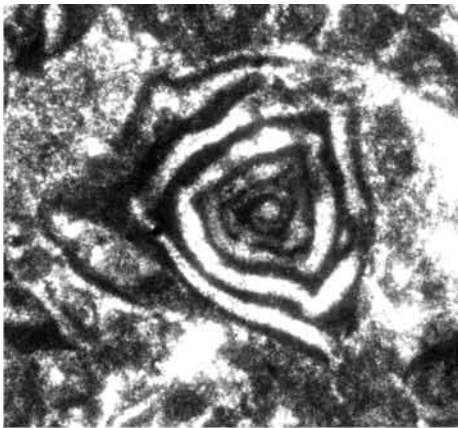
TAVOLA IV

Figg. 1-15 - *Palaeocornuloculina ausonensis* n. gen., n. sp. x 75

- Fig. 1** - sezione equatoriale, olotipo;
figg. 2, 10, 15 - sezioni subequatoriali parziali;
fig. 3 - sezione equatoriale, paratipo;
fig. 4 - sezione subassiale;
figg. 5, 6, 11 - sezioni equatoriali;
figg. 7, 8, 12, 14 - sezioni subassiali, paratipi;
fig. 9 - sezione trasversale obliqua;
fig. 13 - sezione assiale, paratipo.

Tutte le figure dalla località-tipo, parte superiore della sezione stratigrafica della Serra del Pruno (Monti Ausoni, Lazio meridionale), Cenomaniano superiore.

Plate IV



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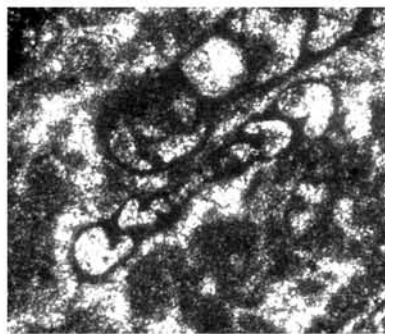
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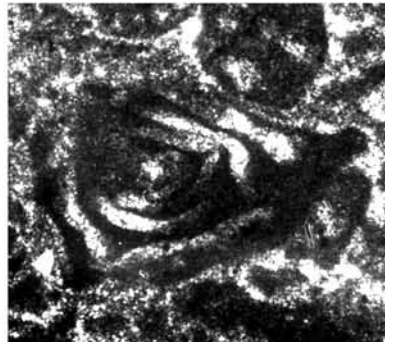
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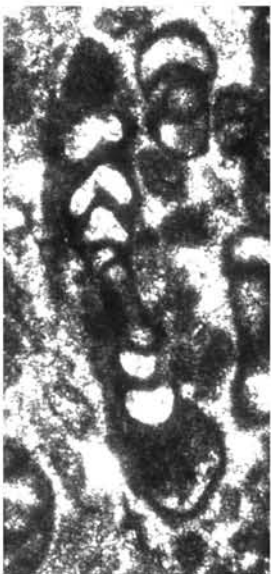
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PLATE V

Figs. 1-12 - *Palaeocornuloculina lepina* n. gen., n. sp. x 75

- Fig. 1** - equatorial section, holotype;
figs. 2, 4, 10 - subaxial sections, paratypes;
figs. 3, 5 - equatorial section, paratype;
fig. 6 - transverse oblique section;
fig. 7 - subequatorial section;
figs. 8, 9 - subaxial sections;
fig. 11 - transverse oblique section, paratype;
fig. 12 - axial section, paratype.

All figures from the type-locality, middle part of Rave Insuglio stratigraphic section (Lepini Mts., Southern Latium), Lower Cenomanian.

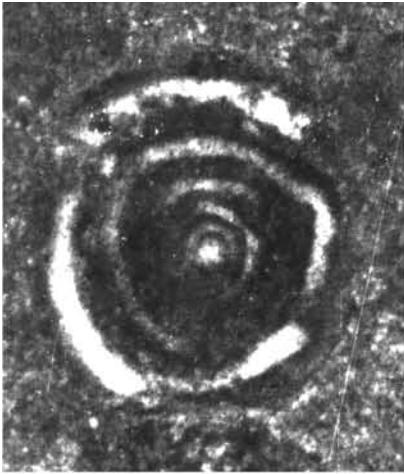
TAVOLA V

Figg. 1-12 - *Palaeocornuloculina lepina* n. gen., n. sp. x 75

- Fig. 1** - sezione equatoriale, olotipo;
figg. 2, 4, 10 - sezioni subassiali, paratipi;
figg. 3, 5 - sezione equatoriale, paratipo;
fig. 6 - sezione trasversale obliqua;
fig. 7 - sezione subequatoriale;
figg. 8, 9 - sezioni subassiali;
fig. 11 - sezione trasversale obliqua, paratipo;
fig. 12 - sezione assiale, paratipo.

Tutte le figure dalla località-tipo, parte media della sezione stratigrafica di Rave Insuglio (Monti Lepini, Lazio meridionale), Cenomaniano inferiore.

Plate V



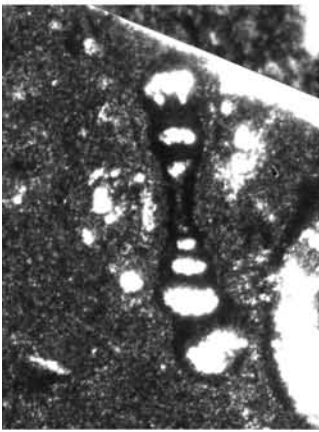
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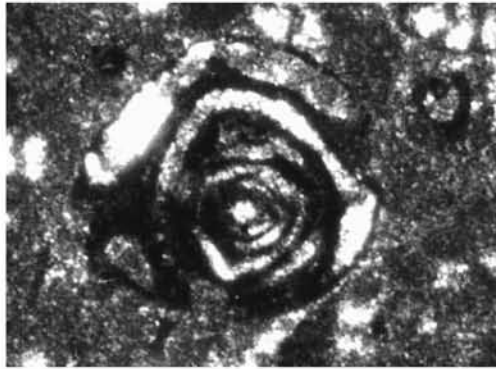
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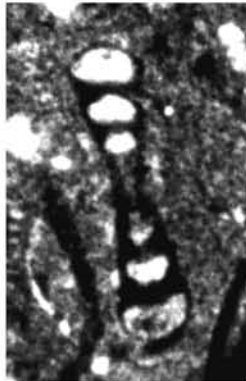
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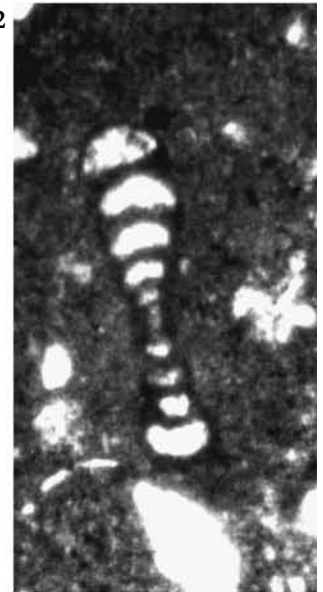


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