

**CAIROELLA TRICAMERATA N. GEN., N. SP. (FORAMINIFERIDA, MILIOLOIDEA) FROM THE LOWER CENOMANIAN OF MONTE CAIRO (SOUTHERN LATIUM, CENTRAL ITALY)**

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**Key words:** Foraminiferida (Milioloidea, ?Hauerinidae), systematics, new taxa, biostratigraphy, Cenomanian, Southern Latium, Central Italy.

**Abstract.** A new porcelaneous foraminifer, *Cairoella tricamerata* n. gen., n. sp., is here described from the lower Cenomanian of the Monte Cairo area near Cassino (Southern Latium, Italy). The new taxon is characterized by an early stage with triloculine to quinqueloculine coiling, followed by one or two whorls, each consisting of three or more tubular, curved, flattened and undivided chambers, with depressed sutures; it is ascribed to the superfamily Milioloidea, but the inferred attribution to the family Hauerinidae remains uncertain. In the type-locality its occurrence is restricted to the back-edge facies of the Latium-Abruzzi carbonate platform represented by fossiliferous grain-supported limestone rich in *Selliavoolina viallii* Colalongo, 1963.

**INTRODUCTION**

Several new genera and species of benthic porcelaneous foraminifers have been recently described from the Cenomanian-Turonian carbonate sediments of Southern Latium (central Apennines, Italy). They are considered significant for biostratigraphy, due to their restricted stratigraphic range, and for paleoenvironmental reconstructions (Chiocchini 2008a, 2008b). These new taxa are: *Sigmomassilina ottadunensis* Chiocchini, *Palaeosigmoilopsis apenninica* Chiocchini, *Spiroloculina cenomana* Chiocchini, *Peneroplis cairensis* Chiocchini in Cenomanian deposits and *Spirosigmoilina rajkae* Chiocchini in upper Turonian deposits from the south-eastern sector of the Monte Cairo; *Paleocornuloculina lepina* Chiocchini in the lower Cenomanian sediments of the Lepini Mts.; *Paleocornuloculina triangularis* Chiocchini and *P. ausonensis* Chiocchini in lower and upper Cenomanian sediments of the Ausoni Mts., respectively. The aim of this work is to provide a systematic description of a new taxon *Cairoella tricamerata* n. gen., n. sp. from the lower Cenomanian of the Monte Cairo area (Southern Latium, Fig. 1), complementing the taxa already described from the same area.



Fig. 1 - Geographic map showing the location of the Monte Cairo area in Southern Latium.

From a geological and palaeogeographical point of view, the area is located between inner carbonate platform facies (Simbruini Mts., Ernici Mts., Lepini Mts., Ausoni Mts., Aurunci Mts.) and edge and back-edge carbonate platform facies (Eastern Marsica, Monti d'Ocre and Sirente Mts.) (Chiocchini et al. 1995). The Jurassic-Cretaceous carbonate

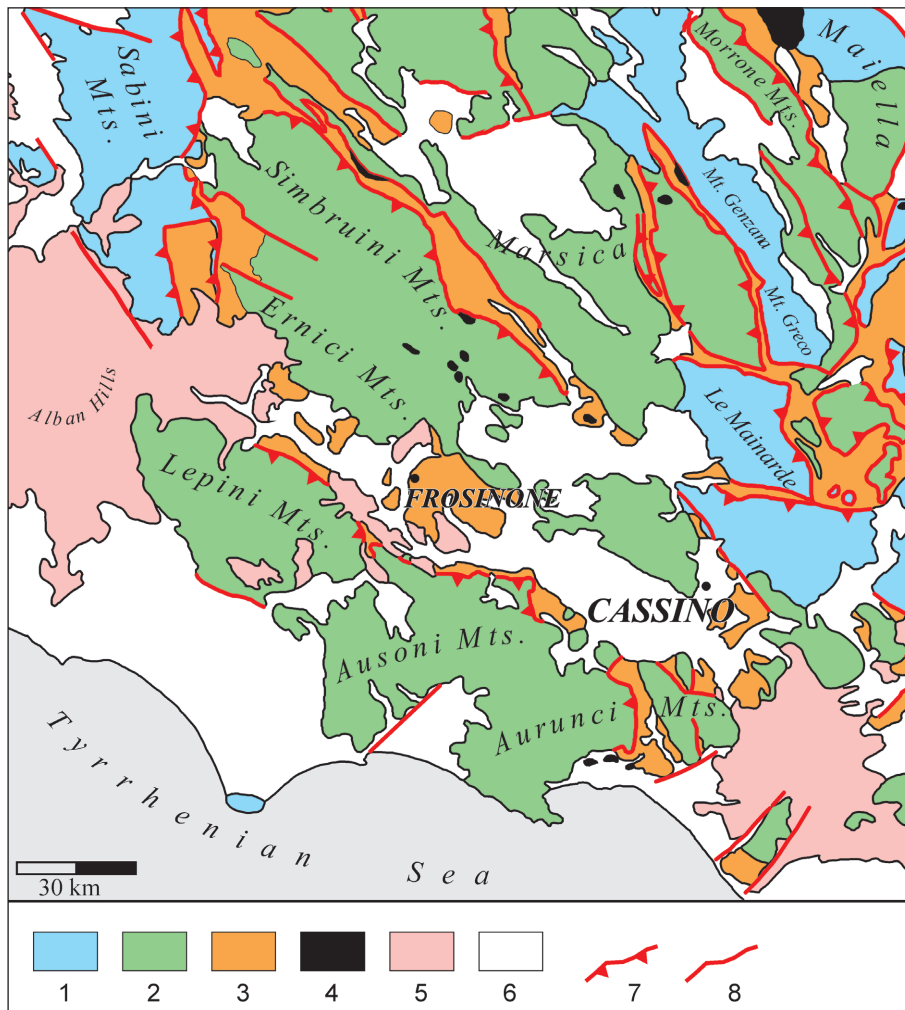


Fig. 2 - Schematic geological map of the central Apennines (modified after Parotto & Praturlon 2004): 1) Meso-Cenozoic deep-water limestones (Umbria-Marche Basin); 2) Meso-Cenozoic shallow-water limestones (Latium-Abruzzi Platform); 3) foredeep siliciclastic deposits; 4) undifferentiated Messinian-Lower Pliocene evaporitic and clastic deposits; 5) Pleistocene volcanics; 6) Plio-Pleistocene marine and continental deposits; 7) thrust; 8) undifferentiated fault.

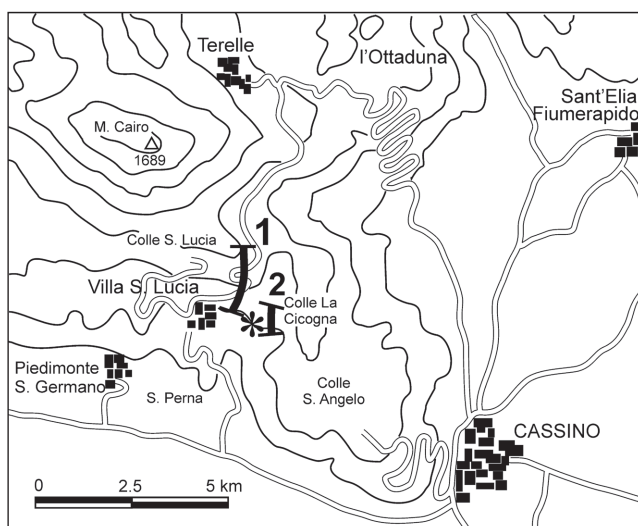


Fig. 3 - Topographic detail of the southern sector of Monte Cairo: 1) trace of the Colle Santa Lucia stratigraphic section; 2) trace of the Colle La Cicogna stratigraphic section; an asterisk indicates the position of the type-level of *Cairoella tricamerata* n. gen., n. sp.

succession of Monte Cairo is indicative of back-edge environment (Fig. 2).

The biostratigraphic analysis refers to the scheme by Chiocchini et al. (2008). It represents a revision of previous schemes used for stratigraphic studies on the Mesozoic Latium-Abruzzi carbonate platform (Chiocchini & Mancinelli 1977, 1978; Chiocchini et al. 1995), that are correlated with different schemes used by other authors in Table 1 of Chiocchini et al. (2008). The new taxon was observed in a grain-supported limestone containing *Selliavealina viallii*, that crops out in the lower part of the Colle La Cicogna stratigraphic section (Fig. 3, 4) figured by Chiocchini et al. (2004) and referred to the back-edge depositional environment of the Latium-Abruzzi carbonate platform. This stratigraphic section, about 130 m thick, crops out along the southern side of the homonymous relief and is characterized by bauxitic levels. The lower bauxitic level (bx 1) corresponds to a large gap in sedimentation extending from the lower Albian to the lower Cenomanian p.p. The upper bauxitic level (bx 2) is represented by breccias with reddish cement and corresponds to a gap spanning the lower Turonian

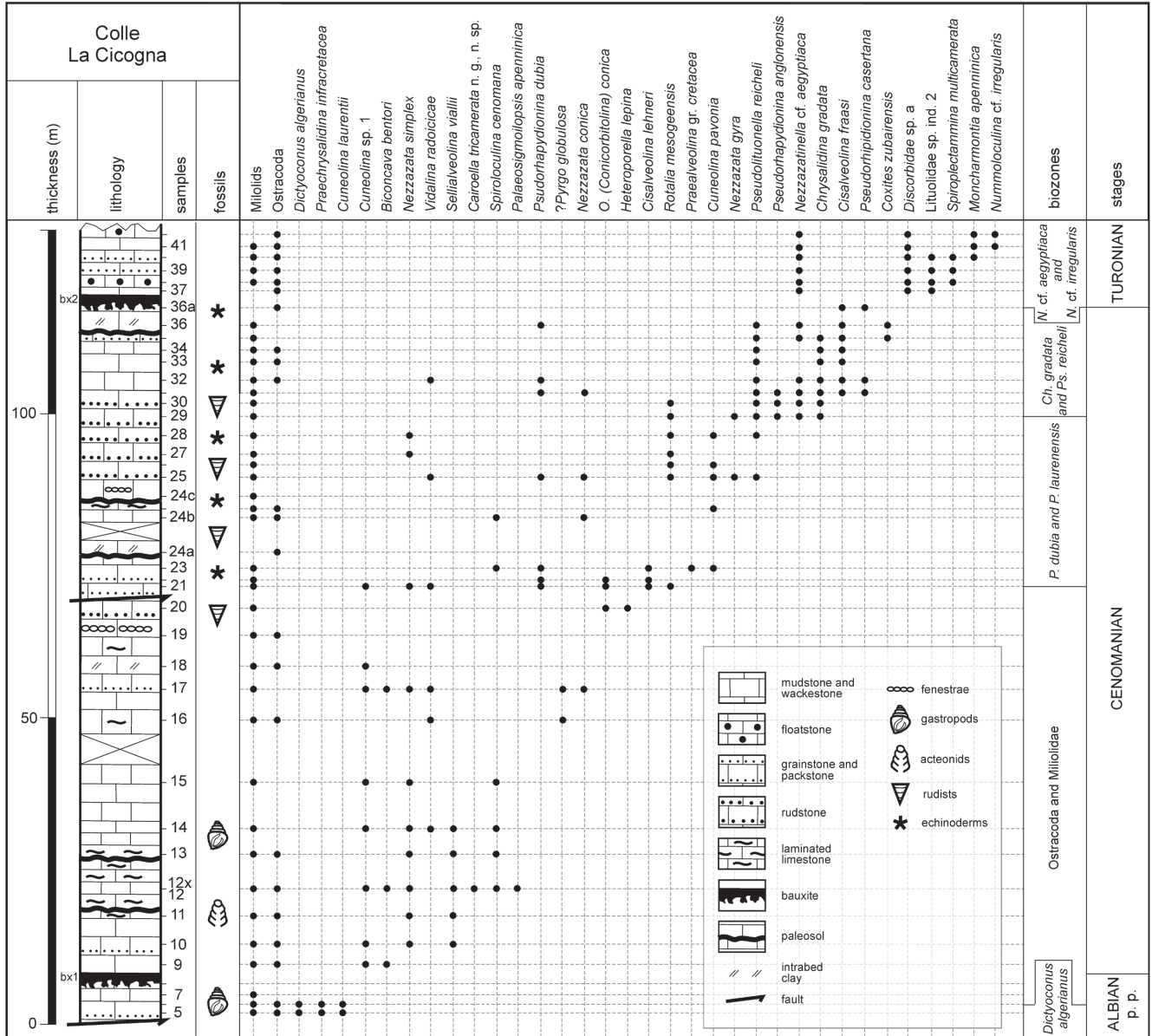


Fig. 4 - Colle La Cicogna stratigraphic section: lithology, biozones and range chart of the most significant benthic foraminifers, ostracoda and mollusc remains (modified after Chiocchini et al. 2004).

(Coccia 2000; Mancinelli & Chiocchini 2006). Samples have been collected from 350 to 600 m a.s.l.

**SYSTEMATIC DESCRIPTION**

The suprageneric classification refers to Loebllich & Tappan (1987). The suffix *-oidea* is used according to the International Code of Zoological Nomenclature (1999) for the superfamily names.

Order **Foraminiferida** Eichwald, 1830  
 Suborder **Miliolina** Delage & Hérouard, 1896  
 Superfamily **Milioloidea** Ehrenberg, 1839

Family ?Hauerinidae Schwager, 1876  
 Genus *Cairoella* n. gen.

Type species: *Cairoella tricamerata* n. sp.

**Derivatio nominis:** After the provenance of the new taxon from the Monte Cairo area, Southern Latium.

**Diagnosis:** Test free, subcircular in outline, planispiral semi-involute, composed by few whorls; early chamber arrangement from triloculine to quinqueloculine, last stage with three or rarely four tubular, curved and flattened chambers per whorl with depressed sutures; chambers longer than high, undivided. Aperture circular or arched at the centre of the septum.

**Age and occurrence:** Cenomanian, Central Italy.

**Remarks.** The attribution of the new genus to the family Hauerinidae Schwager, 1876 is un-

certain because in the suprageneric classification of Loeblich & Tappan (1987) it is specified that in this family the test, in the early stage, is composed “by two chambers per whorl”, whereas “the adult test may have more than two chambers per whorl”.

The genus *Derwentina* Neagu, 1968 shows some affinity with *Cairoella* n. gen., but it differs from the new taxon for having two or two and a half chambers per whorl in the adult stage, for the coiling axis perpendicular to the axis of the early stage and for the ovoid aperture with crenulated border (Neagu 1968).

### *Cairoella tricamerata* n. sp.

Pl. 1, figs 1-21; Fig. 5

**Derivatio nominis:** From the presence of three chambers in the last whorls.

**Holotype:** Specimen illustrated in equatorial section in Plate 1, fig. 4 (thin section A.1284), deposited in the micropaleontological collection of the Geological Survey of Italy, ISPRA, Rome. Scale bars 0.1 mm.

**Holotype measurements:** Proloculus diameter: 0.03 mm; max diameter of the test: 0.51 mm; max length of the chambers in the last whorl: 0.30-0.34 mm; max height of the chambers in the last whorl: 0.068-0.080 mm.

**Paratypes:** Specimens illustrated in Plate 1, in differently oriented sections: fig. 1) equatorial section, paratype with four chambers from thin section A. 1277; figs. 2), 5), 8), 9 and 12) subequatorial sections, paratypes, thin sections Coll. Sci. 681(28), A.1279, Coll. Sci. 48(2), Coll. Sci. 189(b), Coll. Sci. 48(2); fig. 3) transverse oblique section, paratype from thin section A. 1281; fig. 4) subequatorial section, holotype from thin section A. 1284; figs. 7), 13) and 21) oblique sections, paratypes from thin sections A. 1276, A. 1286, A. 1279; fig. 15) differently oriented oblique sections, paratype from thin section A. 1275. All specimens are deposited in the micropaleontological collection of the Geological Survey of Italy, ISPRA, Rome. Scale bars 0.1 mm.

**Type locality:** Lower part of Colle La Cicogna stratigraphic section (41°30'46"N, 13°46'41"E), near Villa Santa Lucia village, south-eastern Monte Cairo, Southern Latium (Central Italy).

**Type level:** Colle La Cicogna stratigraphic section, sample 12x (Fig. 4), lower Cenomanian grain-supported fossiliferous limestone.

**Material:** The holotype and more than 70 paratypes, showed in differently oriented thin sections from the type-level; numerous additional thin sections are available from the Colle Santa Lucia stratigraphic section in the Monte Cairo area.

**Specific diagnosis:** *Cairoella* characterized by planispiral semi-involute coiling, a triloculine to quinqueloculine early stage, three chambers per whorl in the last stage and a simple aperture in the centre of the septa.

**Description.** Test subcircular in outline with slightly lobulate periphery, sides flattened and planispiral, semi-involute coiling. The small globular proloculus (0.03-0.04 mm) lies in the centre of the equatorial plane, and is followed by a triloculine to quinqueloculine early stage; the planispiral semi-

involute last stage is composed of 1-2 whorls with three lengthened, curved and flattened chambers for each whorl, regularly increasing in dimensions as added. The chambers, longer than high, are undivided and separated by feebly depressed sutures. In subequatorial sections the septa between the chambers are thicker at the base and at the top (i.e., X-shaped) (Pl. 1, figs 3, 6, 9, 11, 13).

Wall calcareous, imperforate, porcelaneous, with a surface possibly ornamented by very fine transversal striae. Aperture single, probably circular or arched, in the centre of the septa.

**Remarks.** The ornamentation by transversal very fine striae cannot be clearly observed on the external surface of the test, probably in consequence of recrystallization; it seems to be partially preserved only in the inner whorls of some chambers (Pl. 1, figs 13 and 20), but its presence remains doubtful.

### Biometrical parameters

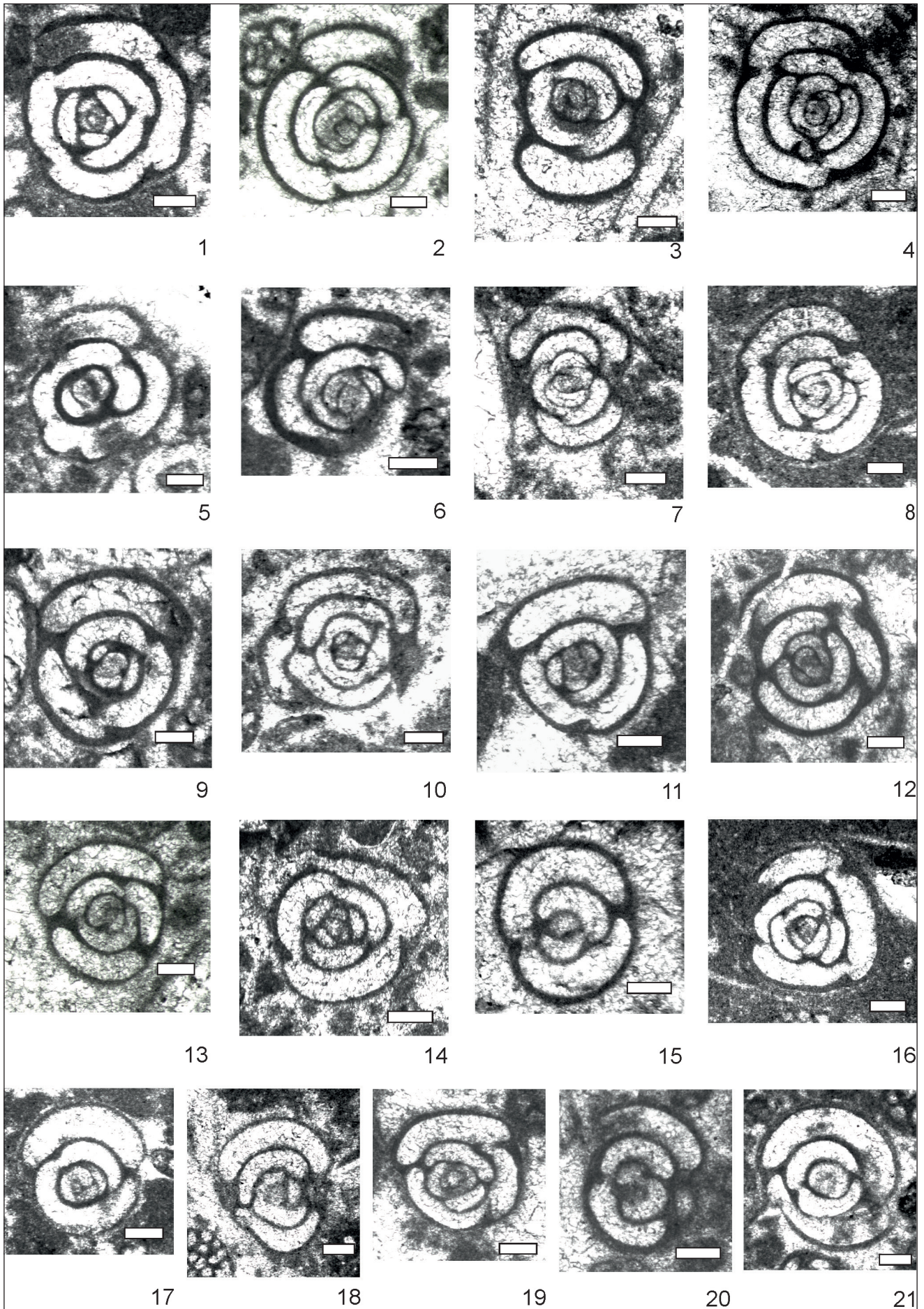
proloculus diameter: 0.030-0.040 mm;  
max diameter of the test: 0.390-0.560 mm;  
number of the whorls in the last stage: 1-2;  
number of the chambers per whorls in the last stage: 3 or rarely 4;  
max length of the chambers in the last whorl: 0.295-0.346 mm;  
max height of the chambers in the last whorl: 0.068-0.106 mm.

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### PLATE 1

Figs. 1-21 - *Cairoella tricamerata* n. gen., n. sp., from the lower Cenomanian of the Colle La Cicogna stratigraphic section of the Monte Cairo, Southern Latium, Central Italy.

- 1) subequatorial section, paratype from thin section A. 1277;
  - 2), 5), 8), 9) and 12) subequatorial sections, paratypes from thin sections Coll. Sci. 681(28), A.1279, Coll. Sci. 48(2), Coll. Sci. 189(b), Coll. Sci. 48(2);
  - 3) transverse oblique section, paratype from thin section A. 1281;
  - 4) subequatorial section, holotype from thin section A. 1284;
  - 6) subequatorial section from thin section A. 1279;
  - 7), 13) and 21) oblique sections, paratypes from thin sections A. 1276, A.1286, A. 1279;
  - 10), 11), 14) and 16) subequatorial sections from thin sections Coll.Sci. 48(2), A. 1275, A.1283, A. 1277;
  - 15) differently oriented oblique sections, paratype from thin section A. 1275;
  - 17), 18) and 19) differently oriented oblique sections from thin section A. 1281, Coll. Sci. 48(2), A. 1277;
  - 20) transverse oblique section from thin section A. 1275.
- Scale bar 0.1 mm.



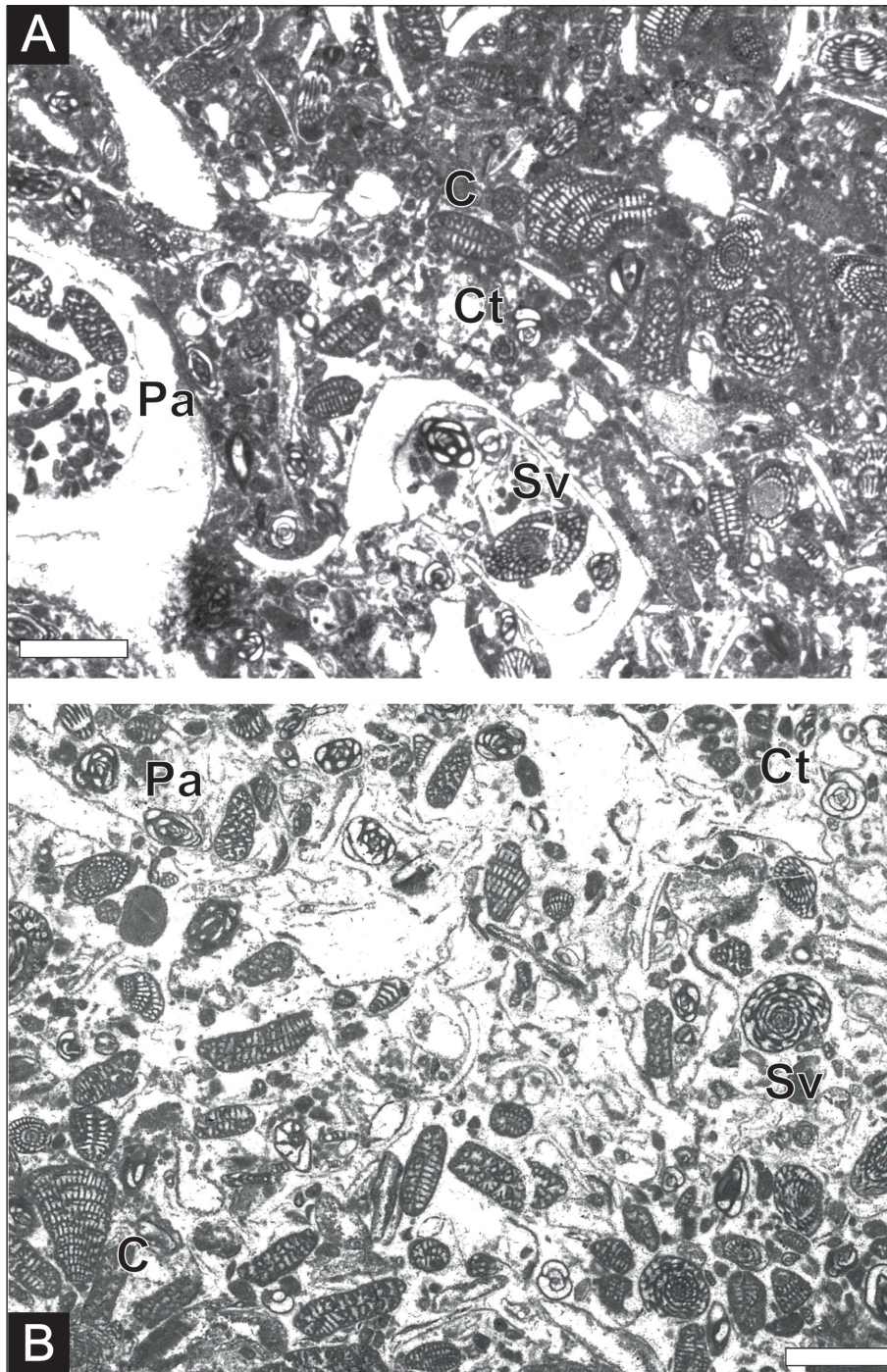


Fig. 5 - A) Packstone with *Sellialveolina viallii*, *Cuneolina* sp. 1, *Palaeosigmoilopsis apenninica*, *Cairoella tricamerata* n. gen., n. sp., benthic foraminifera and molluscan remains. Thin section A. 1277. Colle La Cicogna stratigraphic section, Ostracoda e Miliolidae biozone, lower Cenomanian. B) Grainstone with *Sellialveolina viallii*, *Cuneolina* sp. 1, *Palaeosigmoilopsis apenninica*, *Cairoella tricamerata* n. gen., n. sp., benthic foraminifera and mollusca remains. Thin section Coll. Sci. 188(8). Colle La Cicogna stratigraphic section, Ostracoda e Miliolidae biozone, lower Cenomanian. Scale bar 1 mm.

Abbreviations: Ct: *Cairoella tricamerata* n. gen., n. sp.; Sv: *Sellialveolina viallii*; Pa: *Palaeosigmoilopsis apenninica*; C: *Cuneolina* sp.

**Fossil assemblage of the type-level.** *Cairoella tricamerata* n. gen., n. sp. occurs with *Sellialveolina viallii* Colalongo, *Nezzazata simplex* Omara, *Biconcava bentori* Hamaoui & Saint-Marc, *Spiroloculina cenomana* Chiocchini, *Palaeosigmoilopsis apenninica* Chiocchini, *Cuneolina* sp. 1, miliolids and gastropods. The same association is observed in samples from the Colle Santa Lucia stratigraphic section.

**Stratigraphic range.** In the type-locality the stratigraphic range of the new species is restricted to the lowermost Cenomanian, corresponding to the

Ostracoda and Miliolidae biozone of Chiocchini et al. (2008).

**Depositional environment.** Back-edge of the Latium-Abruzzi carbonate platform, with hydrodynamic conditions varying from moderately to high.

## CONCLUSION

*Cairoella tricamerata* n. gen., n. sp. occurs in the Lower Cenomanian of the Monte Cairo succes-

sion, associated to *Selliaveolina viallii*. Based on its restricted stratigraphic range in the type-locality, it is a potential index species for the lower Cenomanian of the Latium-Abruzzi platform. Further investigations are needed to assess in detail its entire stratigraphic range and areal distribution. Accordingly, the new taxon can be added to the other significant benthic foraminifers and calcareous algae characterizing the Cenomanian and Turonian deposits of the Apenninic Periadriatic carbonate platforms in the Central Mediterranean bioprovince.

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