

*HEDBERGELLA RHINOCEROS* SP. N.,  
A POTENTIAL NEW BIOSTRATIGRAPHIC MARKER  
FROM LATE APTIAN–EARLY ALBIAN  
MARNE A FUCOIDI (CENTRAL ITALY)

RODOLFO COCCIONI (\*) & FRANCESCO COCON (\*\*)

*Key-words:* Planktonic Foraminifera, new species, Mid–Cretaceous, Marne a Fucoidi, Umbro–Marchean Apennines.

*Riassunto.* Viene descritta e illustrata una nuova specie di Foraminifero planctonico, *Hedbergella rhinoceros*, caratterizzata da una camera finale relativamente allungata e avente un profilo da subangoloso ad acuto. La specie qui proposta come nuova è stata osservata in livelli stratigrafici riferibili all’Aptiano superiore – Albiano inferiore delle Marne a Fucoidi (Appennino umbro–marchigiano, Italia centrale). I tipi di *Hedbergella rhinoceros* provengono dalla sezione di Poggio le Guaine, presso Cagli.

*Abstract.* A new planktonic foraminiferal species, *Hedbergella rhinoceros*, from the Late Aptian to the Early Albian sediments of the Marne a Fucoidi formation (Umbro–Marchean Apennines, central Italy) is described and illustrated.

## Introduction.

Aim of the present paper is to describe and illustrate a new planktonic foraminifer, namely *Hedbergella rhinoceros* sp. n., which was repeatedly observed in the Marne a Fucoidi from the Umbro – Marchean Apennines in the interval from the Late Aptian to Early Albian (Fig. 1). The Marne a Fucoidi (Early Aptian – Late Albian) outcropping in the Umbro–Marchean Apennines are the subject of a more comprehensive lithostratigraphic and biostratigraphic study carried by the University of Urbino (Coccioni et al., 1987a and b; Coccioni et al., 1988; Coccioni & Battistini, in prep.). Holotype and paratypes of the above described new species come from a rich foraminiferal assemblage belonging to the lower part of the *Hedbergella trocoidea* Zone (Late Aptian, Gargasian) *sensu* Sigal (1977); in this assemblage *Hedbergella rhinoceros* sp. n.

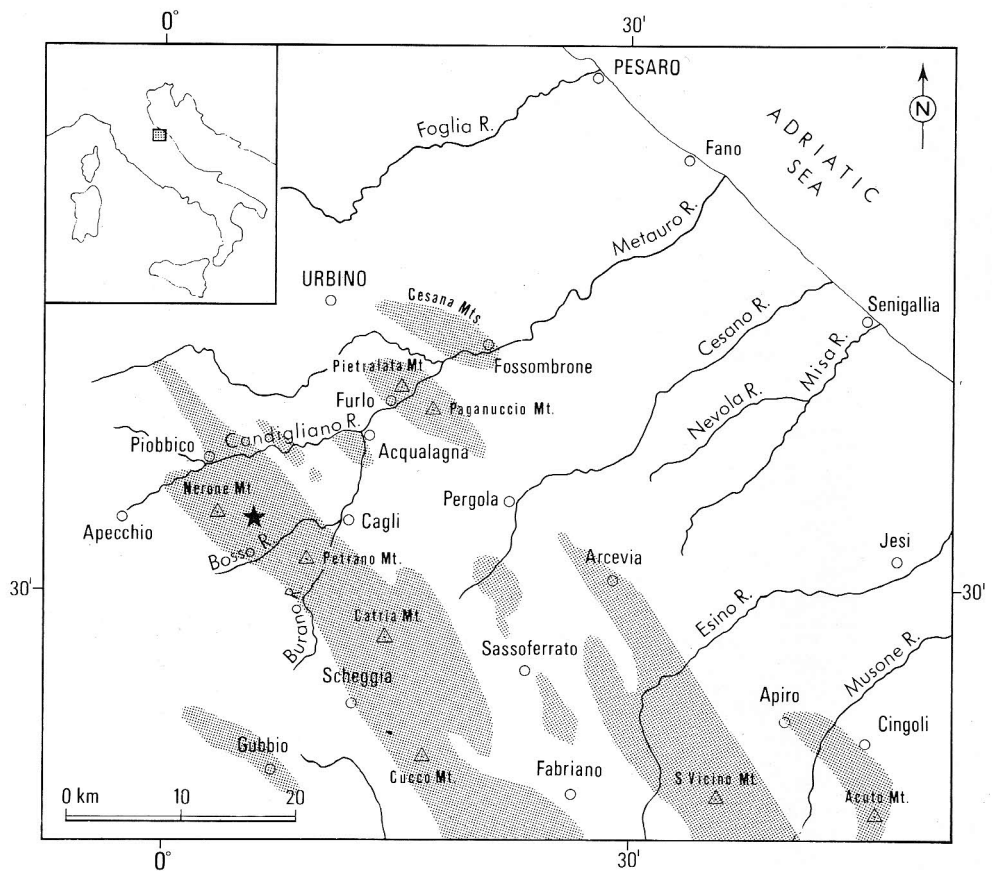


Fig. 1— Location of the Poggio le Guaine section (black star). Hatched areas indicate Umbro—Marchean and Marchean Ridges.

is fairly frequent and associated with abundant planktonic foraminifera such as *Globigerinelloides blowi* (Bolli), *Hedbergella delrioensis* (Carsey), *H. gorbatchikae* Longoria, *H. trocoidea* (Gandolfi), *Planomalina cheniourensis* (Sigal), rare benthonic foraminifera (few species of the genera *Dentalina*, *Dorothia*, *Gavelinella*, *Glomospirella*, *Lenticulina* s.l., *Nodosaria*, *Tritaxia*) and scattered ostracodes and radiolarians. In the Umbro—Marchean Apennines *Hedbergella rhinoceros* sp. n. has been recognized by Coccioni & Battistini (in prep.), from the middle part of the *Globigerinelloides algerianus* Zone (Late Aptian, Gargasian), to the lower part of the *Hedbergella planispira* Zone (Early Albian) *sensu* Sigal (1977). *Hedbergella rhinoceros* sp. n. occurs rare to fairly frequent in the examined faunal assemblages; it is fairly frequent in the stratigraphic levels located just above and below the first occurrence of *Planomalina cheniourensis* (Sigal). *Hedbergella rhinoceros* sp. n. occurs mainly in the «lower reddish marly

member» of the Marne a Fucoidi formation (Coccioni et al., 1987a and b; Coccioni et al., 1988; Coccioni & Battistini, in prep.).

**Systematic description**

Order **Foraminiferida** Eichwäld, 1830

Suborder **Globigerinina** Delage & Hérouard, 1896

Superfamily *Rotaliporacea* Sigal, 1958

Family *Hedbergellidae* Loeblich & Tappan, 1961

Subfamily *Hedbergellinae* Loeblich & Tappan, 1961

Genus *Hedbergella* Brönnimann & Brown, 1958

***Hedbergella rhinoceros* sp. n.**

Pl. 50, fig. 1–8; Text–fig. 3 g–i

*Derivatio nominis.* This species derives its name from the latin *rhinoceros* = rhinoceros, referring to its semi–elongate, horn–shaped, last chamber.

*Holotype.* Fig. 3 g–i; Pl. 50, fig. 1 a–c.

*Paratypes.* Pl. 50, fig. 2–8.

*Type locality.* Holotype and paratypes come from the Poggio le Guaine section (lat. 43° 32' 32" N, long. 0° 08' 02" E) (Fig. 1).

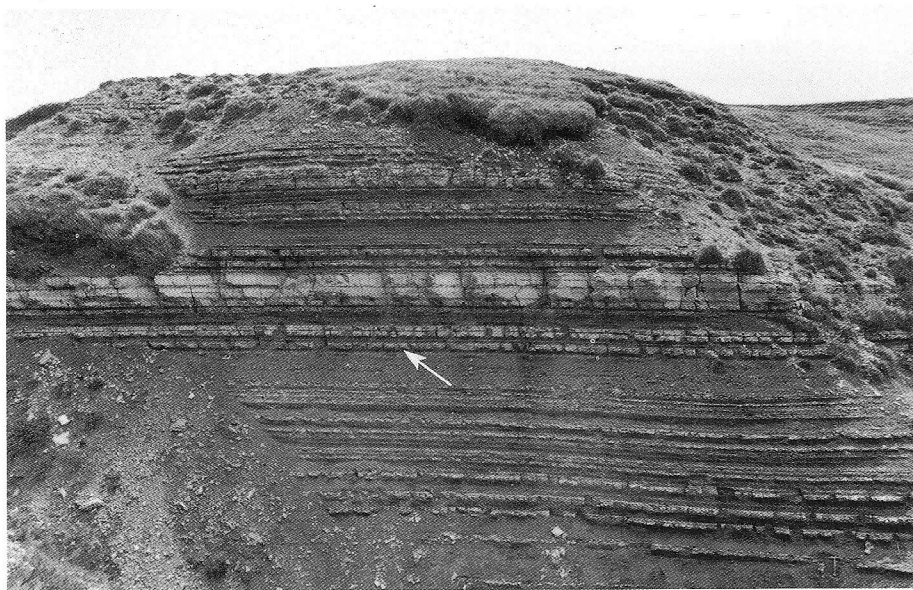


Fig. 2— Poggio le Guaine section, Marne a Fucoidi, middle portion of the «lower reddish marly member». White arrow indicates the type–level (sample PLG–88) of *Hedbergella rhinoceros* sp. n.

**Type-level.** Holotype and paratypes come from a reddish foraminiferal rich marl (sample PLG-88,  $\text{CaCO}_3 = 40\%$ ) collected in the «lower reddish marly member» (Coccioni et al., 1987a and b; Coccioni et al., 1988; Coccioni & Battistini, in prep.) (Fig. 2) of Late Aptian (Gargasian) through Early Albian age of the Marne a Fucoidi formation, lower part of the *Hedbergella trocoidea* Zone (Sigal, 1977) (1), Late Aptian (Gargasian).

**Repository.** Holotype and paratypes are deposited in the collection of the Geological Institute, University of Urbino, Catalogue numbers CC 1-8. CC 1 is the holotype.

**Diagnosis.** Low to medium-high trocospiral *Hedbergella* of medium to large sizes, with seven to nine chambers in the last whorl; final chamber semi-elongate, horn-shaped, considerably larger than the penultimate chamber; peripheral margin of final chamber subangular to acute; in axial profile, periphery of earlier chambers of the last whorl broadly rounded.

**Description.** Medium to large sized calcareous test, coiled in a low to medium-high trocospire, formed by  $2\frac{1}{2}$  - 3 whorls. Equatorial periphery ovate, lobate; axial profile biconvex, usually with slightly more convex spiral side; in axial profile, the periphery of the earlier chambers of the last whorl is broadly rounded while the last chamber in the final whorl has subangular to acute peripheral margin. Seven to eight, rarely nine, chambers in the last whorl, increasing gradually in size as added, except for the final chamber which is considerably greater than the penultimate chamber. Early chambers of the last whorl subtrapezoidal on spiral side, subtriangular in umbilical view and nearly spherical in side view; final chamber semi-elongate, protruding off the equatorial periphery, subrhomboidal to subpentagonal on both spiral and umbilical sides, ogival in lateral view, peripheral margin subangular to acute. Sutures radial, straight, depressed on both spiral and umbilical sides. Aperture extraumbilical-umbilical, a low arch. Umbilicus narrow, circular. No supplementary apertures visible.

**Size.** Maximum diameter = 300-680 microns; minimum diameter = 250-520 microns; thickness = 150-370 microns.

**Remarks.** *Hedbergella rhinoceros* sp. n. (Fig. 3 g-i; Pl. 50, fig. 1-8) is distinguished from *Hedbergella trocoidea* (Gandolfi) (Fig. 3 a-f) by its semi-elongate, subangular to acute final chamber; moreover, the final chamber of the last whorl exceptionally protrudes towards the umbilical area as, on the contrary, frequently occurs in *Hedbergella trocoidea* (cf. Gandolfi, 1942; Caron & Luterbacher, 1969; Longoria, 1974).

---

(1) It is worth noticing that our recent investigations (Coccioni & Battistini, in prep.) point out that, unlike what proposed by Sigal (1977), in the Umbro-Marchean sequences the first appearance of *Hedbergella trocoidea* (Gandolfi) occurs in the lower to middle part of *Globigerinelloides algerianus* total range—Zone *sensu* Sigal (1977).

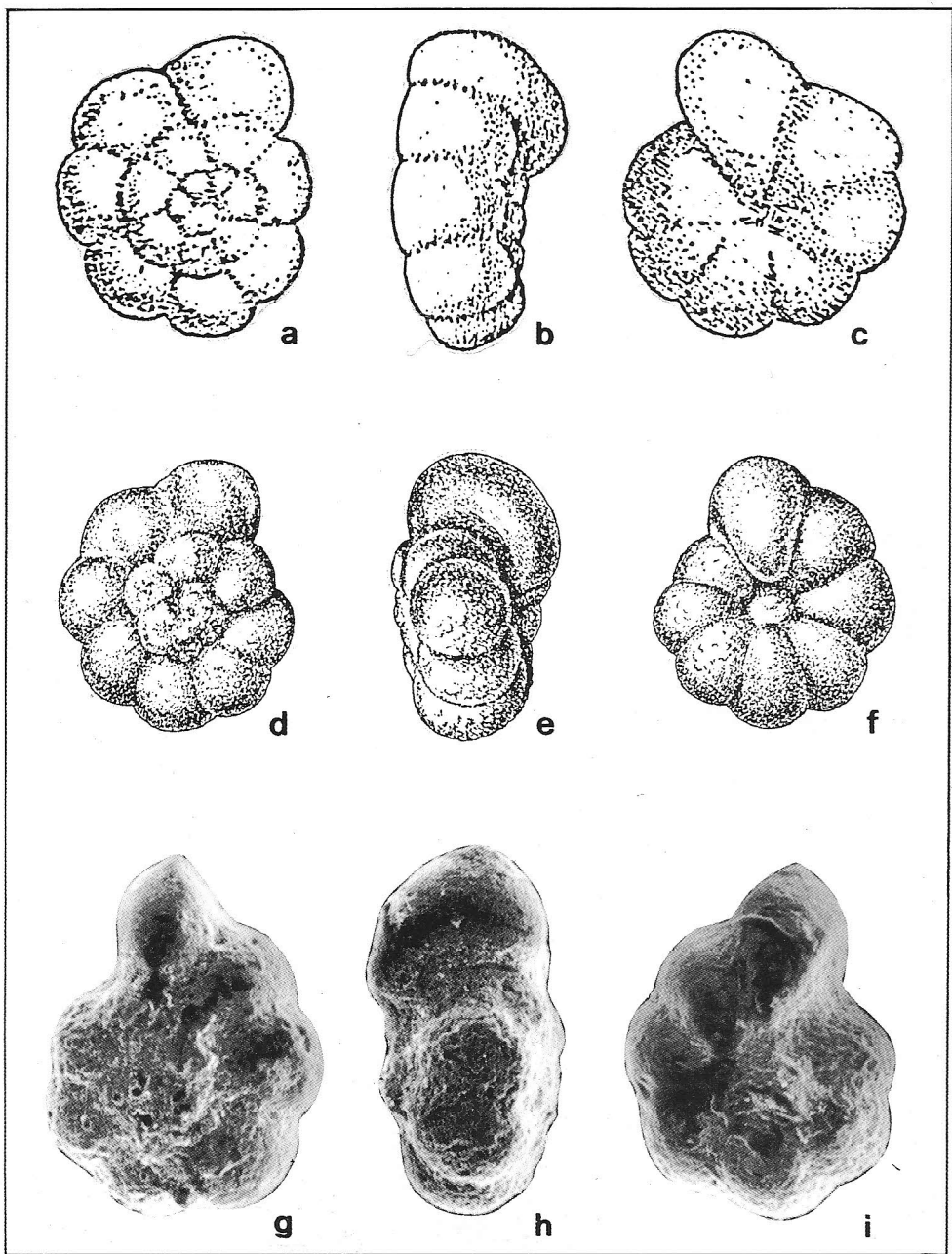


Fig. 3 a - c — *Hedbergella trocoidea* (Gandolfi). Holotype (Gandolfi, 1942). a) Spiral view; b) side view; c) umbilical view; x 80.  
d - f — Lectotype of *H. trocoidea* from Caron & Luterbacher (1969). d) Spiral view; e) side view; f) umbilical view; x 80.  
g - i — *Hedbergella rhinoceros* sp. n. Holotype. Poggio le Guaine section, sample PLG-88. g) Spiral view; h) side view; i) umbilical view; x 80.

*Hedbergella rhinoceros* sp. n. and *H. trocoidea* occur in the same assemblages, where no intermediate morphological forms can be observed; therefore the former is quite distinct from the latter, and cannot be considered as its subspecies. Furthermore, one could suggest to regard *Hedbergella rhinoceros* sp. n. as an ecophenotype (resulting from an environmental stress) rather than a real taxon; nevertheless, the widespread occurrence of *H. rhinoceros* sp. n. recognized by Coccioni & Battistini (in prep.) in the whole Umbro–Marchean area and, therefore, in different paleoenvironmental settings, does not support this suggestion.

**Intraspecific variability.** The variability of *Hedbergella rhinoceros* sp. n. is expressed by the number of chambers (seven to nine) in the last whorl, both the width and acuteness of final chamber and, moreover, the height of the trochospire which can vary from flat to moderately elevated (see Pl. 50, fig. 1–8).

**Age and species distribution.** In the Umbro–Marchean Apennines, *Hedbergella rhinoceros* sp. n. has been recognized from the middle part of the *Globigerinelloides algerianus* Zone (Late Aptian, Gargasian) to the lower part of the *Hedbergella planispira* Zone (Early Albian) *sensu* Sigal (1977).

#### Acknowledgements.

We thank Prof. C. Rossi Ronchetti and Prof. I. Premoli Silva for having critically reviewed the manuscript and provided constructive suggestions. We are grateful to Prof. G.F. Laghi for his sincere and friendly interest in our investigations. Technical help was provided by P. Ferrieri (S.E.M.).

The present paper was supported by Ministero Pubblica Istruzione of Italy by means of a 40% grant to Prof. F.C. Wezel. This is contribution no. 114 of the Geological Institute of the Urbino University.

#### CITED REFERENCES

- Caron M. & Luterbacher H.P. (1969) - On some type specimens of Cretaceous planktonic Foraminifera. *Contr. Cush. Found. Foram. Res.*, v. 20, pt. 1, pp. 23–29, 3 pl., 1 fig., Bridgewater.
- Coccioni R. & Battistini F. - Stratigrafia delle Marne a Fucoidi dell'Appennino umbro–marchigiano (In preparation).
- Coccioni R., Franchi R., Nesci O., Wezel F.C., Battistini F. & Pallecchi P. (1987a) - Stratigraphy and mineralogy of the Selli Level (Early Aptian) at the base of the Marne a Fucoidi in the Umbro–Marchean Apennines, Italy. *3rd International Cretaceous Symposium*, Tübingen, 26.8 – 8.9.1987. (In press).
- Coccioni R., Nesci O., Tramontana M., Wezel F.C. & Moretti E. (1987b) - Descrizione di un livello–guida «radiolaritico–bituminoso–ititolitico» alla base delle Marne a Fucoidi nell'Appennino umbro–marchigiano. *Boll. Soc. Geol. It.*, v. 106, pp. 183–192, 5 fig., Roma.

- Coccioni R., Franchi R., Nesci O., Perilli N. & Wezel F.C. (1988) - Stratigrafia, micropaleontologia e mineralogia delle Marne a Fucoidi delle sezioni di Poggio le Guaine e del Fiume Bosso (Appennino umbro-marchigiano). *Atti II Convegno Internazionale «Fossili, Evoluzione, Ambiente»*, Pergola, 25-30 ottobre 1987. (In press).
- Gandolfi R. (1942) - Ricerche micropaleontologiche e stratigrafiche sulla Scaglia e sui Flysch cretacici dei dintorni di Balerna (Canton Ticino). *Riv. Ital. Paleont.*, v. 48, n. 4 suppl., pp. 1-160, 14 pl., 49 fig., Milano.
- Longoria J.F. (1974) - Stratigraphic, morphologic and taxonomic studies of Aptian planktonic Foraminifera. *Rev. Esp. Micropaleont.*, n. extraord. 1974, pp. 1-134, 27 pl., 7 fig., Madrid.
- Sigal J. (1977) - Essai de zonation du Crétacé Méditerranéen à l'aide des Foraminifères planctoniques. *Géol. Médit.*, v. 4, n. 2, pp. 99-108, 2 pl., Aix-en-Provence.

## PLATE 50

*Hedbergella rhinoceros* sp. n.

Fig. 1— Holotype. Catalogue no. CC 1. a) Spiral view; b) side view; c) umbilical view.

Fig. 2— Paratype. Catalogue no. CC 2. Umbilical view.

Fig. 3— Paratype. Catalogue no. CC 3. a) Spiral view; b) side view; c) umbilical view.

Fig. 4— Paratype. Catalogue no. CC 4. a) Spiral view; b) side view; c) umbilical view.

Fig. 5— Paratype. Catalogue no. CC 5. a) Side view; b) umbilical view.

Fig. 6— Paratype. Catalogue no. CC 6. Spiral view.

Fig. 7— Paratype. Catalogue no. CC 7. Spiral view.

Fig. 8— Paratype. Catalogue no. CC 8. a) Spiral view; b) umbilical view.

Holotype and paratypes from Poggio le Guaine section, sample PLG-88.  
All figures x 52.



