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LADINIAN PLATFORM CONODONTS FROM PUNTA BIANCA
(LA SPEZIA - ITALY) (**)

Riassunto — *Conodonti a piattaforma, ladinici, di Punta Bianca (La Spezia - Italia).* Viene qui descritta una piccola fauna a conodonti proveniente dai livelli calcarei soprastanti la lente principale carbonatica della successione triassica di Punta Bianca (La Spezia).

Nonostante il cattivo stato di conservazione degli esemplari, è stato possibile identificare *Gondolella transita* KOZUR & MOSTLER, *Gondolella mombergensis* TATGE e *Gondolella pseudolonga* Kovács, KOZUR & MIETTO. Si tratta quindi di una tipica fauna della *Gondolella transita* - Assemblage - Zone del Fassanico (Ladinico inferiore).

Abstract — A small conodont fauna from limestone layers overlying the main limestone lens of the Triassic sequence at Punta Bianca (La Spezia) is described. It has been possible to identify *Gondolella transita* KOZUR & MOSTLER, *Gondolella mombergensis* TATGE and *Gondolella pseudolonga* Kovács, KOZUR & MIETTO. It is a typical fauna of *Gondolella transita* - Assemblage - Zone of Fassanic (Lower Ladinian).

Key words — Platform conodonts; Lower Ladinian; continental slope; Massa Unit.

INTRODUCTION

At Punta Bianca, near La Spezia (Fig. 1), a Triassic succession belonging to the lower part of Tuscanide II (Massa Unit) (FEDERICI & RAGGI, 1976) outcrops. This succession differs from other analogues stratigraphic sequences in Northern Tuscany because, besides

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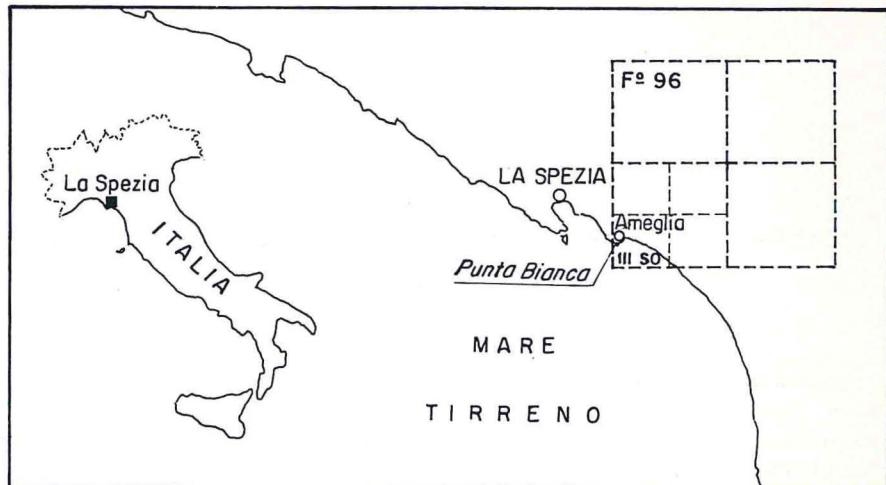


Fig. 1 - Location of the Triassic sequence of Punta Bianca.

the usual clastic deposits, it includes calcareous and volcanic rocks as well (ELTER, GIGLIA, RAU & TONGIORGI, 1966).

Field relationships and chemical composition of volcanic rocks (RICCI & SERRI, 1975) fit with the tensional (rifting) model for the western margin of the « adriatic plate » (Apulia: SCANDONE, 1975; RAU & TONGIORGI, 1981) during Middle-Upper Triassic time.

GANDIN, RAU, TONGIORGI and the author recently began a detailed study of the whole Triassic sequence of Punta Bianca to solve the evolution of this succession and to test the proposed model for a Middle-Upper Triassic abortive rifting.

The purpose of this paper is to describe the small conodont fauna, which has been obtained from the top of the main limestone lens at Punta Bianca (Fig. 2). Previously, ELTER and FEDERICI (1964) assigned the limestone lens to Middle Triassic and more precisely to Ladinian (FEDERICI, 1966).

THE PUNTA BIANCA SECTION

Very schematically the Triassic Punta Bianca section, unconformably overlaying the Paleozoic basement, is constituted by the following lithological units from the base (Fig. 2):

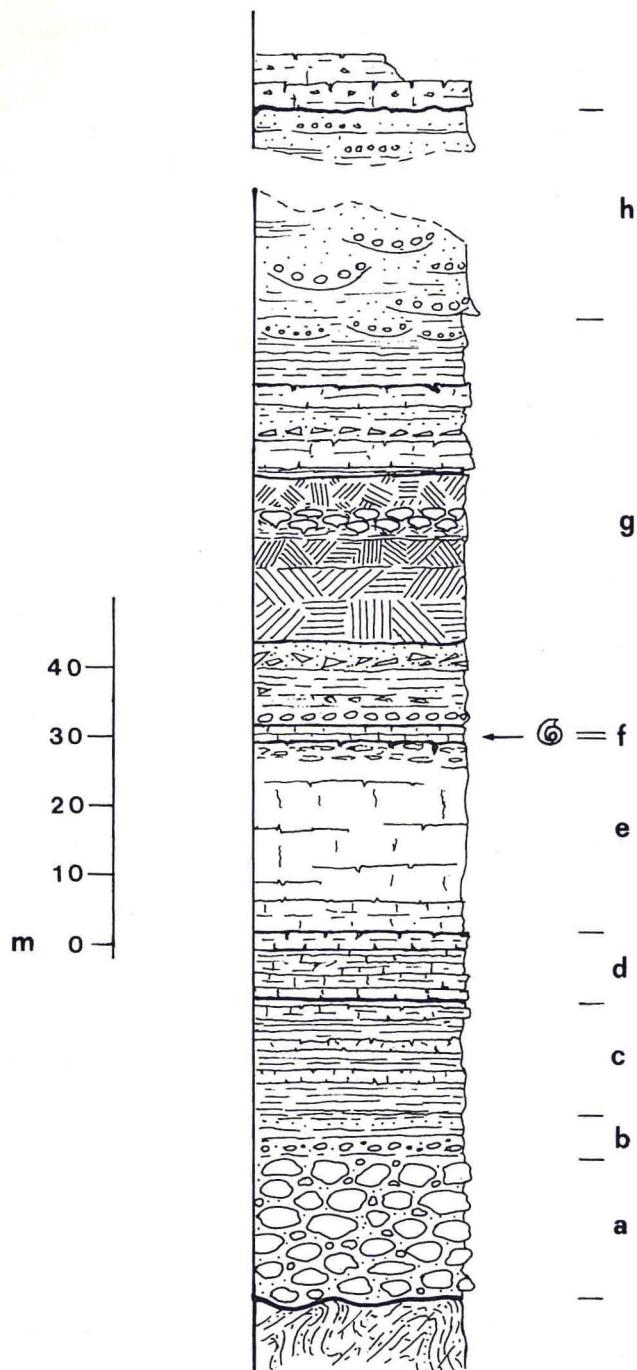


Fig. 2 - Schematic log of the Triassic sequence of Punta Bianca. For explanation see text.

a) green conglomerate (20 m); b) black siltstones and sandstones (6-7 m) grading upward to c) dark limestones with interbedded shales (15 m); d) platy limestones with diploporas and gastropods (9 m); e) a large lens of white massive to brecciated limestone (20 m); f) closely interbedded limestones and shales bearing bivalves and small ammonites (1 m); g) a predominantly clastic sequence (60 m) composed of violet siltstones and sandstones with interbedded breccias whose elements are mostly represented by underlaying limestones, basic pillow lavas and few white limestone lenses; h) typical Carnian quartzites and anagenites (80 m) grading upwards to Norian-Rhaethian limestones.

The conodont bearing samples are bedded limestones of unit f. Stratigraphically they are located immediately above the white lens of unit e. The fossiliferous interval of unit f consists of interbeds of finely bedded gray carbonates (2-4 cm beds) and gray-green marls/shales (5,5 cm max. thick). The calcareous beds are poorly graded pseudomicrospatites, and can be classified as wackestone-packestone. Bioclasts include small ammonites, brachiopods, pelecypods and a small number of gastropods. Fossils of uniform size can be highly concentrated in the beds. Coarse fragments of completely calcitized terrestrial plant-fossils have been recorded at only one horizon.

THE STRATIGRAPHIC SIGNIFICANCE OF THE CONODONT FAUNA AND CONCLUSION

The conodont fauna was obtained from two samples (B4 and B6). The conodonts are predominantly platforms of the genus *Gondolella*. Compound elements and sponge spicules also occur in the residues. The specimens are badly preserved and only a small number has been recorded. The conodont fauna can be assigned to the *Gondolella transit* Assemblage-Zone (Lower Ladinian). This correlation is based on the presence of *Gondolella transit* KOZUR & MOSTLER, *Gondolella mombergensis* TATGE and *Gondolella pseudolonga* KOVÁCS, KOZUR & MIETTO.

VENTURI and TENNERONI (personal communication, 1981) are studying the small ammonites just from the same levels. They have obtained a probable Anisian age. That is not incompatible

with the conodont fauna age: in fact these sediments were deposited in shelf-edge to upper slope environment. Field evidence shows that the platform and the upper slope were cut by canyons. Commonly, older or subcontemporaneous sediments and their contained faunas are reworked in such environments and it is suggested that the fossiliferous rocks at Punta Bianca have been reworked. This interpretation is confirmed by the distribution of the macrofossils and the corroded nature of conodonts. This interpretation could be even confirmed by a more exact dating of limestone beds at the base of the large limestone lens (unit e). These beds have a high density of diploporas and show evidence for shallow water to lagoonal environment. Conodonts have not been recorded from these beds, probably due to the sedimentary environment, which is inhospitable for the conodontophorid.

CONODONT SYSTEMATICS

All specimens are stored in the collections of the Istituto di Geologia e Paleontologia dell'Università di Pisa (IGP).

Gen. GONDOLELLA STAUFFER & PLUMMER, 1932

Type species: *Gondolella elegantula* STAUFFER & PLUMMER, 1932

Gondolella cf. *excelsa* (MOSHER)

(Pl. 1, fig. 7 a, b)

- 1965 *Gondolella navicula* - BUDUROV & STEFANOV, pl. 3, figs. 1, 2.
- 1968 *Paragondolella excelsa* n.sp. - MOSHER, pp. 938-939, pl. 118, figs. 1-8.
- 1972 *Gondolella excelsa* (MOSHER) - KOZUR & MOSTLER, pl. 3, figs. 1, 2.
- 1973 *Neogondolella excelsa* (MOSHER) - SWEET in KLAPPER et al., pp. 135-136, *Neogondolella* pl. 1, fig. 10.
- 1980 *Gondolella excelsa* (MOSHER) - KOVÁCS & KOZUR, pl. 3, fig. 7.
- 1980 *Gondolella excelsa* (MOSHER) - MIETTO & PETRONI, p. 553, pl. 57, fig. 1.

Remarks: The general outline corresponds with *Gondolella excelsa* (MOSHER) by high anterior carina decreasing posteriorly and by the platform that surrounds the last denticle. The specimen is deformed, which prohibits a positive species identification.

Material: 1 specimen in sample B4 (IGP 4961 - 1).

Gondolella mombergensis TATGE

- 1956 *Gondolella mombergensis* n.sp. - TATGE, p. 132, pl. 6, figs. 1, 2.
 1958 *Gondolella mombergensis* TATGE - HUCKRIEDE, p. 147, pl. 10, figs. 26, 27, 29, 30,
 42, 43, 45.
 1968 *Gondolella mombergensis* TATGE - MOSHER, pp. 937-938, pl. 116, figs. 6, 9, 10, 12, 15.
 1968 *Gondolella mombergensis prava* n.sp. - KOZUR, p. 930, pl. 2, fig. 2.
 1974 *Neogondolella mombergensis* (TATGE) - BUDUROV & STEFANOV, pl. 2, figs. 18, 19.
 1980 *Gondolella mombergensis* TATGE - KOVÁCS & KOZUR, pl. 4, figs. 4-6; pl. 5, figs. 1, 3.
 1980 *Gondolella mombergensis* TATGE - MIETTO & PETRONI, p. 554, pl. 57, fig. 10.

Material: 1 specimen in sample B4 (IGP 4961 - 2).

Gondolella pseudolonga KOVÁCS, KOZUR & MIETTO
 (Pl. 1, fig. 5 a, b)

- 1980 *Gondolella pseudolonga* n.sp. - KOVÁCS, KOZUR & MIETTO, pp. 217-220, pl. 1. (syn.
 through 1980).

Remarks: The specimens are badly preserved. They have a very slender outline, a pit that shifts forward with a small step behind the protruding margin and a carina of constricta-type. These features characterize *G. pseudolonga*.

Material: 2 specimens in sample B6 (IGP 4961 - 3, 4).

Gondolella transita KOZUR & MOSTLER
 (Pl. 1, fig. 1 a, b, c, fig. 2 a, b)

- 1971 *Gondolella transita* n.sp. - KOZUR & MOSTLER, p. 13, pl. 2, fig. 12 (non vid).
 1972 *Neogondolella excentrica* n.sp. - BUDUROV & STEFANOV, pp. 840-841, fig. 7, pl. 4,
 fig. 18-28.
 1972 *Gondolella transita* KOZUR & MOSTLER - KOZUR & MOSTLER, pl. 1, fig. 1.
 1973 *Neogondolella transita* (KOZUR & MOSTLER) - SWEET in KLAPPER et al., p. 153,
 Neogondo - pl. 1, fig. 9.
 1975 *Neogondolella excentrica* BUDUROV & STEFANOV - SWEET in KLAPPER et al., pp.
 225-226.
 1980 *Gondolella transita* KOZUR & MOSTLER - KOVÁCS & KOZUR, pl. 4, fig. 14, pl. 5, fig. 4, 7.
 1980 *Gondolella transita* KOZUR & MOSTLER - MIETTO & PETRONI, pp. 555-556, pl. 57, fig. 9.

Remarks: *Gondolella excentrica* is regarded as synonym of *Gondolella transita*. The lateral bend and the width of the platform

of the Punta Bianca specimens resemble the *transita*-types of *Gondolella transita*. One specimen shows transitional features to *Metapolignatus truempii* (HIRSCH).

Material: 6 specimens in sample B6 (IGP 4961 - 5-10).

Gondolella cf. *transita* KOZUR & MOSTLER
(Pl. 1, fig. 4 a, b)

Remarks: The specimen differs from typical *transita*-forms in having a large and prominent terminal cusp.

Material: 1 specimen in sample B6 (IGP 4961 - 11).

Gondolella sp. A
(Pl. 1, fig. 3 a, b)

Description: The specimen is asymmetric, because it has a sharp anterior constriction on one side of the platform. The anterior carina is high and the height decreases posteriorly. The denticles are fused at the base. The keel is narrow and has a small protruding pit. The anterior and posterior ends are broken.

Material: 1 specimen in sample B6 (IGP 4961 - 12).

Gondolella sp. B

Description: This specimen has an outline which compares with *Gondolella acuta*. The badly preserved specimen, however, does not allow for any positive identification on species level.

Material: 1 specimen in sample B6 (IGP 4961 - 13).

Gondolella sp. C
(Pl. 1, figs. 6 a, b, c)

Description: The unit is moderately arched. The platform reaches the anterior end. It is slightly constricted at the posterior end on the outer side. The carina consists of a few and strong denticles. The keel is narrow and has a small elliptical pit.

Remarks: The specimen is probably a juvenile form.

Material: 1 specimen in sample B6 (IGP 4961 - 14).

Gondolella sp. D
(Pl. 1, fig. 8)

Description: Elongated specimens with a platform that extends the whole lenght of the unit. The margins are parallel in the posterior two-thirds of the specimen. The posterior end of the platform is rounded and slightly asymmetric. The platform surrounds the last small denticle of the carina. The height of the denticles gradually descrases towards the posterior part. The keel is narrow and it has an elliptical loop. The pit is very small and nonprominent.

Material: 3 specimens in sample B6 (IGP 4961 - 15-17).

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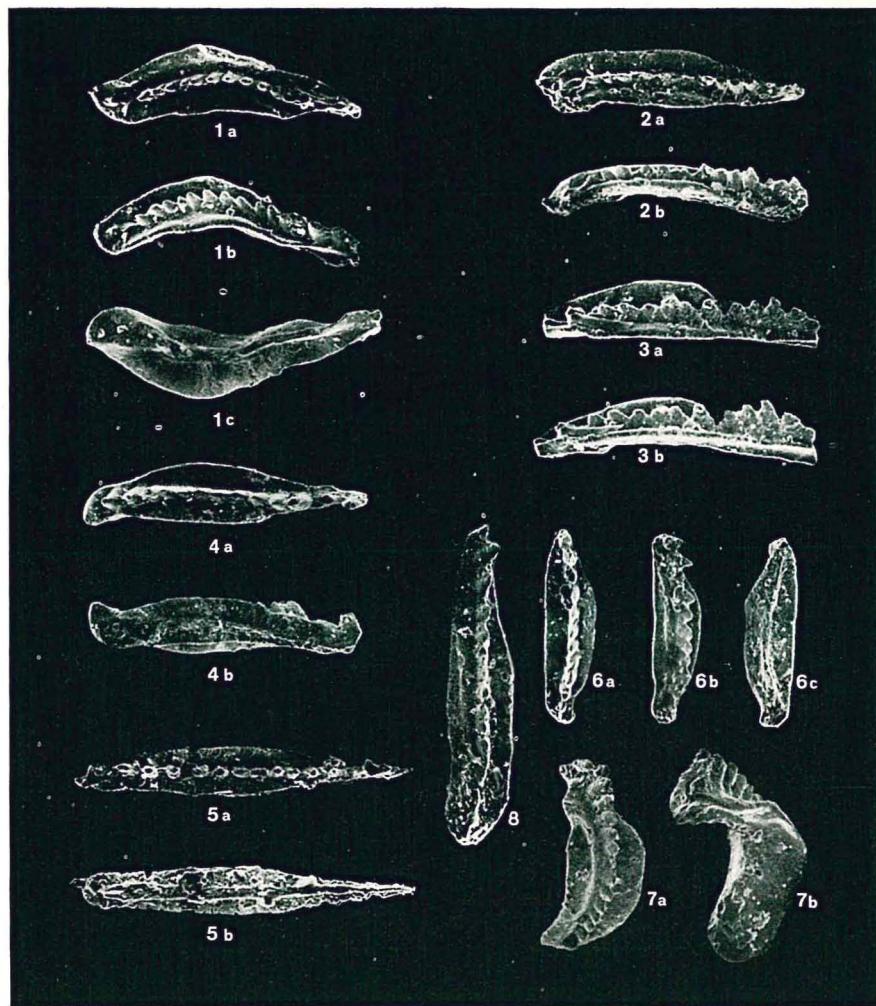


PLATE 1

- Fig. 1 a, b, c - *Gondolella transita* KOZUR & MOSTLER. B6 (IGP 4961 - 5) a: upper view, x 60; b: upper-lateral view, x 60; c: basal view, x 60.
- Fig. 2 a, b - *Gondolella transita* KOZUR & MOSTLER. B6 (IGP 4961 - 6) a: upper view, x 90; b: lateral view, x 90.
- Fig. 3 a, b - *Gondolella* sp. A. B6 (IGP 4961 - 12) a: upper-lateral view, x 90; b: lateral view, x 90.
- Fig. 4 a, b - *Gondolella* cf. *transita* KOZUR & MOSTLER. B6 (IGP 4961 - 11) a: upper view, x 90; b: basal view, x 90.
- Fig. 5 a, b - *Gondolella pseudolonga* KOVÁCS, KOZUR & MIETTO. B6 (IGP 4961 - 3) a: upper view, x 90; b: basal view, x 90.
- Fig. 6 a, b, c - *Gondolella* sp. C. B6 (IGP 4961 - 14) a: upper view, x 90; b: upper-lateral view, x 90; c: basal view, x 90.
- Fig. 7 a, b - *Gondolella* cf. *excelsa* (MOSHER). B4 (IGP 4961 - 1) a: upper view, x 90; b: basal view, x 90.
- Fig. 8 - *Gondolella* sp. D. B6 (IGP 4961 - 15) upper view, x 90.