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Famennian conodonts in the Mt. Pizzul West (PZW) section

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Locality - On the western flank of Mt. Pizzul, at coordinates N 46°33'21.7", E 13°18'18.1".

Lithostratigraphic unit - Pal Grande Fm.

Age - Frasnian-Famennian (Upper Devonian); Upper rhenana Zone and Pa. glabra prima (= Upper crepida) Zone to Pa. m. marginifera (= Lower marginifera) Zone.

What to see - Pal Grande Fm. in nodular facies.

How to get there

The Pizzul West (PZW) section is located in a First World War trench on the western flank of Mt Pizzul at altitude. 1905 m. The section can be reached with a 1.5 hours hike from Passo del Cason di Lanza via path n. 442a up to Forca di Lanza, and then on an unnumbered path to the top of Mt. Pizzul.



Figure 1. Location map of the Pizzul West section.

Historical outline

Conodonts from the Pizzul West section were studied by Mossoni et al. (2013), and a few more samples just to the south by Pondrelli et al. (2015). Beside conodonts, Mossoni (2015) provided magnetosusceptibility data.

Lithology and fossil content

The Pizzul West section (Fig. 2-3) exposes about 24 meters of pelagic mudstones-wackestones of the Pal Grande Fm. The lower and central part of the section (below sample PZW 1) is tectonically disturbed and is affected by folds and/or faults, as confirmed by conodont data (Mossoni et al., 2013).

Mossoni et al. (2013) distinguished three different facies in the section: a light grey massive micritic limestone, a dark red nodular limestone and a grey-ochre nodular limestone. In general, massive grey limestone are more abundant in the lower part, whereas the red nodular limestone prevails in the upper part. A few thin pelitic levels are present in the section between sample PZW 1 and sample PZW 4.

The microfacies of the grey limestone consists of a wackestone with a light grey color and few fossils remains scattered in the matrix (mostly

ostracods and shells); some stylolite structures are also evident.

The red nodular facies consists of a wackstone-packstone with nodules up to 1 cm of diameter, probably due to a syndimentary diagenesis, with haematite precipitations. The fossil content is

higher and includes trilobites, small shells (brachiopods or bivalves), ostracods, a few cephalopods and sponge spiculae.

The grey-ochre nodular limestone consists of a wackstone-packstone similar to the red one, but without the haematite precipitations that most probably give the red color to the former unit.



Figure 2. Views of the Pizzul West section showing the location of the conodont samples (after Mossoni et al., 2013). Views of the Pizzul West section. **A.** Panoramic view of Mt. Pizzul with indicated in red the position of section; **B.** general view of the section in the First World War trench; **C.** the undisturbed part of the section, with location of samples; **D.** detail of the reddish nodular limestone; **E.** the irregular level constituted by gravels and cobbles scattered in a grey micritic cement (sample PZW Z).

Palaeoenvironment

The Pal Grande Fm. deposited in a pelagic distal environment (Spalletta et al., 2015a).

Conodonts

Thirteen samples (Fig. 3), weighting from 1.2 to 2.6 kg, have been collected from the Pizzul West section. All the samples were productive, yielding more than 500 conodonts. The state of preservation is good, even if some specimens are broken. Conodonts color is black (CAI = 5-5.5). The abundance

is very variable, from a maximum of 154 conodonts/kg in sample PZW 5 to a minimum of 0.59 conodonts/kg in sample PZW C; the average abundance is 25.85 conodont/kg.

Forty-one taxa, between species and subspecies, belonging to six genera (*Ancyrodella*, *Bispathodus*, *Icriodus*, *Palmatolepis*, *Pseudopolygnathus*, *Polygnathus*) have been recognized (Fig. 3). *Palmatolepis* is always the dominant genus (Mossoni et al., 2013).

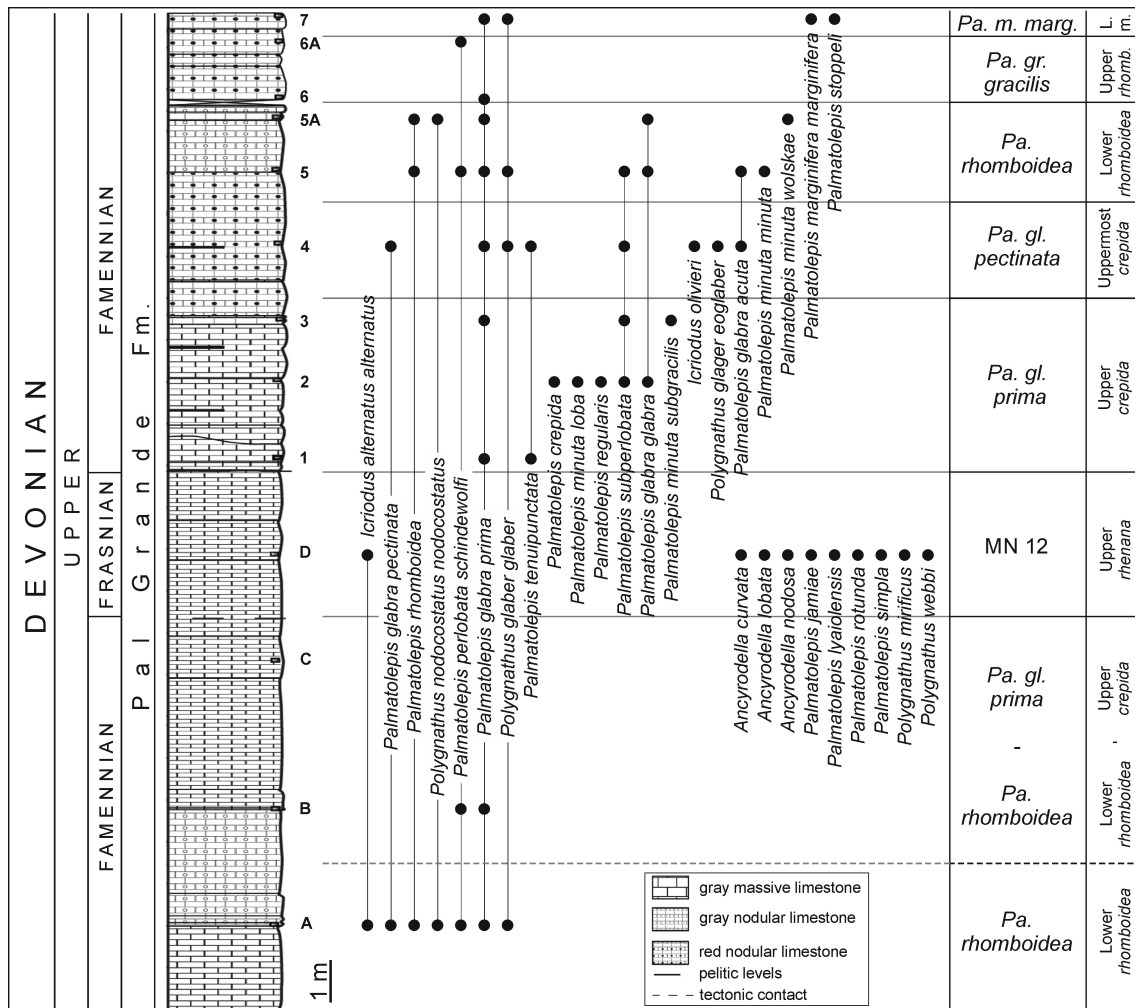


Figure 3. Stratigraphic column of the Pizzul West section and conodont distribution (modified after Mossoni et al., 2013). Conodont zonation after Spalletta et al. (2017).

Biostratigraphy

Six biozones has been recognized (Mossoni et al., 2013):

- The Upper *rhenana* Zone (sample PZW D) has been discriminated thanks to the joint occurrence of *Icriodus alternatus alternatus*, *Palmatolepis rotunda*, *Ancyrodella lobata*, *Palmatolepis jamiae* and *Palmatolepis lyaiolensis*. In fact the first two taxa have their first occurrence, while the others became extinct within this zone.

Figure 4. Conodonts (P1 elements) from the Pizzul West section (all refigured after Mossoni et al., 2013).

- Icriodus olivieri* Corradini, sample PZW 4.
- Icriodus alternatus alternatus* Branson & Mehl, sample PZW D.
- Palmatolepis quadrantinosalobata* Sannemann, sample PZW 4.
- Palmatolepis rhomboidea* Sannemann, sample PZW 5.
- Ancyrodella lobata* Branson & Mehl, sample PZW D.
- Ancyrodella nodosa* Ulrich & Bassler, sample PZW D.
- Palmatolepis minuta minuta* Branson & Mehl, sample PZW 5A.

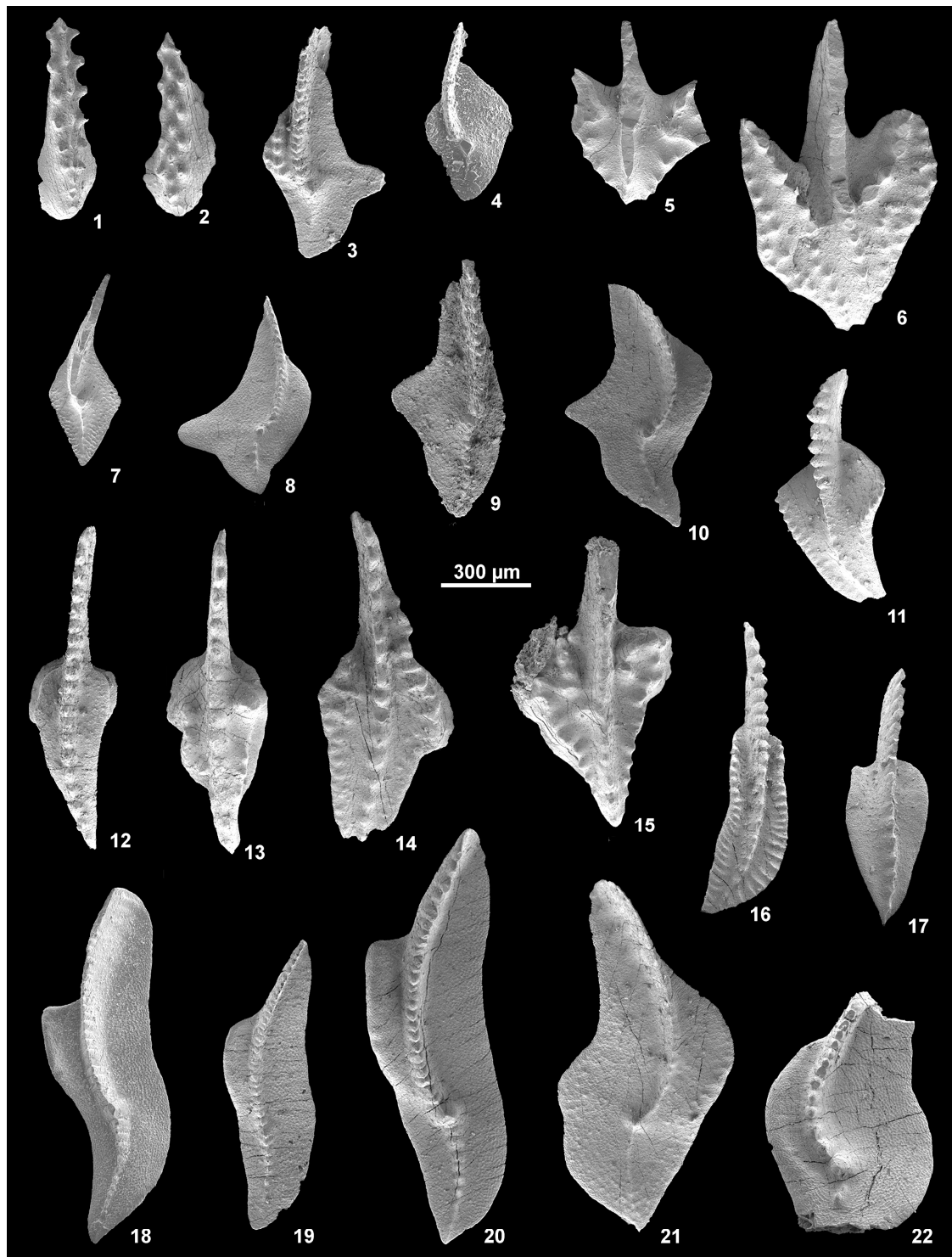


Figure 4. continued.

8. *Palmatolepis subperlobata* Branson & Mehl, sample PZW 4. **9.** *Palmatolepis minuta loba* Helms, sample PZW 2. **10.** *Palmatolepis perlobata schindewolfi* Muller, sample PZW 5. **11.** *Polygnathus marginvolutus* Gedik, sample PZW Z. **12.** *Pseudo-polygnathus micropunctatus* Bishoff & Ziegler, sample PZW Z. **13.** *Pseudopolygnathus inordinatus* Traghelen & Hartenfels, sample PZW Z. **14.** *Pseudopolygnathus controversus* Sandberg & Ziegler, sample PZW Z. **15.** *Pseudopolygnathus marburgensis marburgensis* Bishoff & Ziegler, sample PZW Z. **16.** *Polygnathus obliquicostatus* Ziegler, sample PZW Z. **17.** *Polygnathus glaber glaber* Ulrich & Bassler, sample PZW 5. **18.** *Palmatolepis glabra glabra* Ulrich & Bassler, sample PZW 5. **19.** *Palmatolepis glabra prima* Ziegler & Huddle, sample PZW 5. **20.** *Palmatolepis glabra pectinata* Ziegler, sample PZW 4. **21.** *Palmatolepis perlobata postera* Ziegler, sample PZW Z. **22.** *Palmatolepis marginifera marginifera* Helms, sample PZW 7.

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- The *Pa. glabra prima* (=Upper *crepida*) Zone has been discriminated in samples PZW 1-3, thanks of the first occurrence of the marker *Palmatolepis glabra prima*, and of *Palmatolepis glabra lepta* and *Palmatolepis minuta subgracilis*. The absence of taxa having a younger first occurrence suggests that also sample PZW B may belong to this biozone.
- The *Pa. glabra pectinata* (=Uppermost *crepida*) Zone is recognized in sample PZW 4 by the joint occurrence of the marker *Palmatolepis glabra pectinata* and of *Palmatolepis tenuipunctata*, that has its last appearance datum within this zone (Ji & Ziegler 1993). Also, *Icriodus olivierii* enters here at the base of its known range.
- The *Pa. rhomboidea* (=Lower *rhomboidea*) Zone is discriminated in samples PZW 5-5A by the presence of the marker *Palmatolepis rhomboidea*, and of *Palmatolepis minuta wolskiae* and *Palmatolepis subperlobata* that have their last occurrence within this Zone.
- The *Pa. gracilis gracilis* (=Upper *rhomboidea*) Zone is recognized in samples PZW 6-6A by the extinction of *Palmatolepis minuta wolskiae*: in fact the marker *Pa. gr. gracilis* is absent in the section.
- The *Pa. m. marginifera* (=Lower *marginifera*) Zone (Sample PZW 7) is discriminated by the first occurrence of the marker *Palmatolepis marginifera marginifera*. The presence of *Palmatolepis stoppeli*, which became extinct within this Zone confirms the zonal attribution of PZW 7.

Additional remarks

A few metres north of the section a couple of samples were collected close to a 7–8-cm-thick level of dark gray to black thinly laminated chert.

Here the uppermost beds of the Pal Grande Fm. consists of a breccia or a nodular limestone with very angular to mostly sub-rounded carbonatic clasts/nodules centimeter to decimeter scale in diameter, separated by millimeter- to centimeter-scale thick olive green partings of silty shale (Fig. 3e). Overall, the strata are very poorly sorted with no organization visible in the deposit. The carbonate clasts/nodules consist of light gray mudstone/wackestone that yielded conodonts of the *Pa. expansa* (= Lower *expansa*) Zone (Mossoni et al., 2013; Pondrelli et al., 2015). On top of this facies, a 7–8-cm-thick level of dark gray to black thinly laminated chert has been found. In the following roughly 20 cm, cherts are interbedded with 5- to 10-cm thick dark gray mudstone/wackestone, that have been dated by means of conodonts to the upper Tournaisian *anchoralis-latus* Zone (Pondrelli et al., 2015).

This outcrop is interpreted by Pondrelli et al. (2015) as evidence of subaerial exposure, like another outcrop in Rio Sglirs area, a few Km north-west, recently studied by Corradini et al. (2017).

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