THE UPPER LADINIAN FOSSILS FROM THE VAZZOLER-PELSA LAGOON (CIVETTA, AGORDO DOLOMITES)

→ Andrea Tintori

TRIASSICA-Institute for Triassic Lagerstätten, Perledo (LC); e-mail: paleo.tintori@outlook.it

KEY WORDS
Middle Triassic, fishes, mollusks, corals, silicified fossils.

Marcopoloichthys sp., total length 40mm.

In 1975 the author, as a student, was in this area of the Dolomites with the late prof. Maurizio Gaetani. During field-work he found the tail of a fossils fish and an insect. Now, more than 40 years after, was extremely important to visit the locality again because in the meantime sites bearing fossil marine vertebrates of comparable age (Late Ladinian, Middle Triassic) had been discovered on Monte San Giorgio (Tintori, 1990, Tintori & Lombardo, 1999, Lombardo, 2001, Montagna et al. 2017) and in southern China (Tintori et al., 2012, 2015), whilst little new had come from the Dolomites (Tintori et al., 2016).

The result of a first survey carried out with Matteo Montagna - an entomologist I work with when fossil insects are concerned - in the surroundings of Rifugio Vazzoler and Casera Pelsa was amazing. Among blocks left by recent construction works we found some fish and plant fragments. The best fossil finds, though, were collected in a less recent trenching where beautiful plants were well visible. A few hammer blows then revealed most remarkable fish remains, in particular those undoubtedly belonging to a specimen of *Thoracopterus wushaensis* Tintori et al., 2012, the oldest among flying fishes. This species was described on late Ladinian specimens from the Nimaigu quarry (Wusha, Xingyi, Guizhou province) in southern China. Like further confirmed by P. Mietto (pers. com.), these black rocks outcropping near Casera Pelsa have long been known to date back to Late Ladinian on the basis of ammonoids (Castiglioni, 1936). If we were positively aware that several genera of fishes

Silicified block with gastropods, bivalves and forams.

and marine reptiles are shared by China and the Alps, finding the very same species 8000 km from the Chinese locality is something really unexpected and of great importance.

The same outcrop contained another nice surprise: some layers yielding visibly silicified mollusks and corals. Despite its being hardly more than one meter thick, the succession shows an impressive diversification: terrestrial plants, fishes, reef organisms and dwellers of the shallow, oxygenated waters that probably framed the small islands of the atoll toward the inner lagoon. This latter, apparently quite deep, developed an anoxic – or at least disaerobic - environment in the central area, where fishes and plants had the chance to be preserved. Nonetheless, occasional storm waves disturbed the shallow waters, hauling sediments and organisms from the adjacent reef environments into its deepest part. The invertebrates silicification is unusual for the Triassic: only a few (unpublished) examples are known in the Alps, and it is no coincidence that all of them date back to the Ladinian, when a widespread volcanism released huge amounts of silica. As a result we have usually the cherty limestones of the Buchenstein Formation and, now, this beautiful benthic fauna whose carbonate shells have been substituted by silica. Yet, whenever scientific research is concerned, we can only hypothesize what happened until data will either confirm or deny it. The study has just begun, but the prospect is excellent for this locality to become one of the most important in the Dolomites.

The majority of the fish specimens belong to *Habroichthys* and *Marcopoloichthys* (Tintori et Al. 2008). The former genus, called 'miniature fossil fish' (Tintori et Al. 2015), is only 2-3 cm long and characterizes the Middle Triassic ichthyofaunas. The latter was named after the Venetian explorer Marco Polo since the specimens on which the taxon was erected come from both China and Italy. It is a highly specialized small fish, peculiarly devoid of scales, a rarity in the Triassic. Beside the single specimen ascribed to *Thoracopterus wushaensis*, other remains belong to coelacanths, but also there is a fragment of a shark body, that could seem a meagre find. Actually, beyond isolated small shark teeth and denticles, only a couple of articulated specimens are known from the whole Alpine Triassic. It may reasonably be supposed that further taxa are represented, but a time-consuming preparation is necessary before we can confidently classify the other fossils. Although this new assemblage has a lot in common with the southern Chinese Xingyi Fauna, there are also major differences. In Xingyi many, often very large marine reptiles are found, and invertebrates are generally represented by just few ammonoids and bivalves. On the contrary, as pointed out above, the new site is considerably rich in reef organisms and in other that dwelled the shallow bottom surrounding the reef. Being silicified, these fossils can be isolated from the matrix. The association we have observed so far is well comparable to the San Cassiano Fauna, known since the XIX century, and more recently become famous due to Rinaldo Zardini's magnificent collection in Cortina d'Ampezzo (Zardini, 1988). It is certainly too early for a conclusive interpretation. Yet we are working on the hypothesis that the big radiation involving reef environments occurred a couple of million years earlier than formerly stated on the basis of the San Cassiano Fauna (Early Carnian).

The terrestrial fossil association appears fairly similar to the one described in other Middle Triassic localities of the Dolomites (Kustatscher & Roghi, 2016): conifers and ferns are dominant. Surprisingly, fossil plants are more abundant in the basinal black limestones outcropping near Casera Pelsa and in the Laresei area, suggesting that the islands fringing the lagoon were possibly covered with lush vegetation, favored by the rich volcanic soil. Moreover, as the warm and humid climate was definitely suitable for insects, we have high hopes of finding new specimens after the single one collected 40 years ago.

REFERENCES

Castiglioni, B. (1931): Il gruppo della Civetta (Alpi Dolomitiche). – Memorie dell'Istituto geologico dell'Università di Padova, 9: 36 pp.

Kustatscher, E., Roghi, G. (2016): La flora del Triassico dell'Italia Settentionale/The Triassic flora of northern Italy. La storia delle piante fossili in Italia/Palaeobotany in Italy: 116–151.

Lombardo C. (2001): Actinopterygians from the Middle Triassic of Northern Italy and Canton Ticino (Switzerland): anatomical descriptions and nomenclatural problems. – Rivista Italiana di Paleontologia e Stratigrafia, 107: 345–369.

Montagna, M., Haug, J.T., Strada, L., Haug, C., Felber, M., Tintori, A. (2017): Central nervous system and muscular bundles preserved in a 240 million year old giant bristletail (Archaeognatha, Machilidae). – Scientific Reports, 7, 46016; doi: 10.1038/srep46016

Tintori, A. (1990): The actinopterygian fish *Prohalecites* from the Triassic of N.Italy. Palaeontology, 33(1): 155–174

Tintori, A., Lombardo, C., Kustatscher, E. (2016): The Pelsonian (Anisian, Middle Triassic) fish assemblage from Monte Prà della Vacca/Kühwiesenkopf (Braies Dolomites, Italy). – Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 282(2): 181–200.

Tintori, A., Lombardo, C. (1999): Late Ladinian fish faunas from Lombardy (N-Italy): stratigraphy and paleobiology. Mesozoic fishes 2 - Systematics and the fossil record, G. Arratia & H.-P. Schultze (eds.): 495–504, Verlag Pfeil, München.

Tintori, A., Sun, Z.Y., Lombardo, C., Jiang, D.Y., Sun, Y.L., Rusconi, M. & Hao, W.C. (2008): New specialized basal neopterygians (Actinopterygii) from Triassic of the Tethys realm. – Geologia Insubrica, 10/2 (2007): 13–20.

Tintori, A., Sun, Z.Y., Lombardo, C., Jiang, D.Y., Ji, C., Motani, R., 2012. A new "Flying" fish from the Late Ladinian (Middle Triassic) of Wusha (Guizhou Province, southern China). – Gortania 33: 39–50.

Tintori, A., Sun, Z.Y., Ni, P.G., Lombardo, C., Jiang, D.Y., Motani, R. (2015): Oldest stem Teleostei from the Late Ladinian (Middle Triassic) of southern China. – Rivista Italiana di Paleontologia e Stratigrafia, 121/3: 285–296. DOI: http://dx.doi.org/10.13130/2039–4942/6519

Zardini, R. (1988): Geologia e fossili delle Dolomiti di Cortina e dintorni. Edizioni Dolomiti: 45 pp.