A fossil polychaete worm from the Illyrian of the Dolomites (Northern Italy)

by
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The Polychaetes pertain to a group of usually soft-bodied segmented annelid worms found mainly in a marine habitat. Although being a very old clade, with remains known from the Ediacarian period (580–545 millions of years ago), the fossil record, because of their fragile physical structure, is extremely poor. A new genera of polychaete worms from the Illyrian (Early-Middle Triassic) of the Dolomites is described, *Burocratina kraxentrougeri* gen. et sp. nov., and can give a new insight into understanding the evolution of this animal.

Riassunto

I Policheti appartengono ad un gruppo di vermi segmentati e dal corpo morbido, che generalmente si trovano in habitat marini. Nonostante siano un gruppo molto antico, con fossili conosciuti dal periodo Ediacariano (580-545 milioni di anni fa), la registrazione fossile è estremamente povera a causa della fragilità della loro struttura fisica. Pertanto sará descritto un nuovo genere di polichete proveniente dall´Illiriano (Triassico Medio-Inferiore) delle Dolomiti, *Burocratina kraxentrougeri* gen. et sp. nov. che puó fornire una nuova interpretazione nella longevitá di questo animale.

Zusammenfassung

Die Polychaetes stellen eine zumeist weichkörperige, oft segmentierte Gruppe von Anneliden dar, welche in marinen oder randnahen Bereichen ihre besten Lebensvoraussetzungen finden. Obwohl es sich um eine sehr alten Zweig von primitive Würmern handelt, mit Zeugen schon aus der Ediacara Fauna (580-545 Millionen Jahre) sind fossile Überlieferung, wohl aufgrund ihrer fragilen Struktur sehr selten. Beschrieben wird eine neue Gattung von Polychaetes aus dem Illyr (Frühe-Mittlere Trias der Dolomiten, *Burocratina kraxentrougeri* gen. et sp. nov. die vielleicht neue Erkenntnisse über die Entwicklung dieser Tiere geben kann.

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Key words: Polychaete, fossil worms, Dolomites, Early-Middle Triassic, Illyrian

Introduction

In 2007, Michael Wachtler began an extensive survey around the massif of Piz da Peres, especially at the Furkel Pass in the Pustertal (Fig. 1). In several places over the pass, where some well-stratified rocks emerge from the dense grass, forests and scrubland, he identified several fossil layers. They not only contained a rich spectrum of Anisian-Illyrian vertebrate ichnotaxa (*Sphingopus, Rhynchosauroides, Procolophonichnium, Chirotherium, Isochirotherium, Brachychirotherium* and *Rotodactylus*), but also numerous land plants and invertebrates (worms, bivalves, jellyfishes). Surprisingly, from the trampled form of one of the primitive archosaurs (*Sphingopus ladinicus* (Avanzini & Wachtler, 2012) appeared the body form of one polychaete-like worm. Others, sometimes with characteristic grave traces, were found in the vicinity.

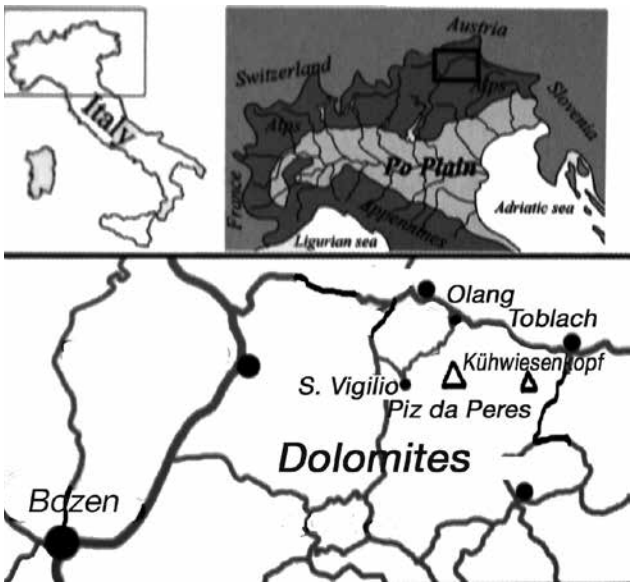


Fig. 1. The Piz da Peres-area in the Dolomites (Northern Italy)

Geological settings

The geology of the Braies Dolomites is well known from several works (Pia, 1937; Bechstädt & Brandner, 1970; De Zanche et al., 1992). Special interest attracted the Anisian successions, with its richness of land plants and vertebrates (*Megachirella wachtleri,* Renesto & Posenato, 2003) and invertebrates. We have to do it with mixed carbonate and terrigenous successions that overlies the top of the Early Anisian (Aegean) carbonates (Lower Serla dolomite).
The trampled layers, in which were found the polychaete worm impressions, are attributed to the Obere Peresschichten sensu. Pia (1937) and Bechstädt & Brandner (1970) officially divided the Richthofen Conglomerate (Avanzini et al., 2007) and Morbiac Dark Limestone (Delfrati & Farabegoli, 2000) (both Illyrian in age).
The Richthofen Conglomerate is dominated by red sandstones and siltstones and subordinate conglomerate beds. This unit has been interpreted as being deposited in a relatively arid fluvial or in a transitional continental to marine environment (De Zanche et al., 1992, 1993; Avanzini et al., 2007) whereas the Morbiac Dark Limestone prevalently consists of silty, decimetre-thick, grey or light brown lime wackestones and packstones. Plant debris and animal tracks are common. The depositional environment is referable to a marine marginal setting with lagoons and swamps contaminated by terrigenous inputs (Delfrati & Farabegoli, 2000).

Paleoecology and Paleoclimatology

The location in the red-grey sandstones over the Furkel-Pass (Olang) in direction to Piz da Peres contains an interesting paleoecosystem with innumerable tetrapod tracks, marine biota and especially a rich plant life composed of conifers (*Voltzia, Alpia, Albertia*), ferns (*Gordonopteris, Neuropteridium, Anomopteris, Ladinopteris*), and cycads (*Bjuvia, Nilssonia, Ladinia, Pseudoctenis*) (Wachtler, 2012). From the ichnospecies, the most dominant are those of *Rhyncho-*

Piz da Peres - Furkel. The location lies in the upper part of the picture inside the Morbiac-layers. Photo: Michael Wachtler

sauroides tirolicus (Abel, 1926), little lizard-like animals that left their traces on the often ripple-marked beach. The depositional environment is referable to a marine marginal setting with lagoons and swamps contaminated by terrigenous inputs (Todesco et al., 2008) and, basing on the plant-remains, a tropical-humid climatic with sometimes occurring storms could be accepted.

Materials and Methods

All specimens described here come from the same layer located at the top of the Richthofen Conglomerate and very near to the uppermost Morbiac Dark Limestone boundary (46°42'52.94"N, 11°58'38.13"E, 2202 m).

Repository

The holotype is stored in the collection of the Museum DoloMythos in Innichen. Other material is deposited at the Natural History Museum Südtirol, Bozen.
Specimens were photographed under natural light using a Nikon D7000 from Nikon Corporation, Tokio, lenses: AF MICRO NIKKOR 60 mm 1:2.8 D and AF-S NIKKOR 17-35 mm 1:2.8 D for larger pieces. The digital images were processed using Adobe Photoshop.

Systematic description

Dominium: Eukaryota
Kingdom: Animalia
Subkingdom: Eumetazoa
Branch: Bilatera
Superphylum: Protostomia
Clade: Lophotrocozoa
Phylum: Annelida
Class: Polychaeta

Genus Burocratina gen. nov. WACHTLER & GHIDONI, 2013

Generic diagnosis

Vermiform animals with practically identical segments tapering gradually and ending in a caudal cirrus. Prostomium holding jaws.

Etymology

After the interminable segmented and never eradicable bureaucracy of human life.

Burocratina kraxentrougeri sp. nov. WACHTLER & GHIDONI, 2013

Holotype

PIZF 129

Material

FP003

Etymology

Ancient Alpine occupation, the archetype of the Sherpas. The 'Kraxe' was a segmented support to carry heavy weights over the mountain.

Type locality

Piz da Peres over the Furkelpass

Type horizon and age

Morbiac Limestone of Illyrian age

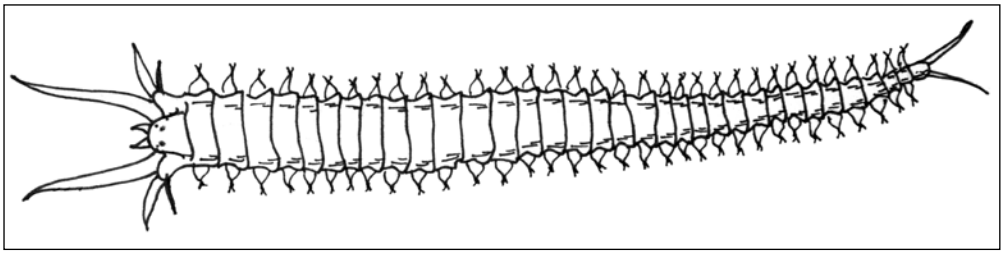
Diagnosis

Fossil annelids with specialised sense organs, a pronounced differentiation of the body in segments bearing on the final somite a well-developed anus and cirrus.

Description

Dimension: The Middle Triassic *Burocratina kraxentrougeri* were 25 to 30 mm long strongly segmented worms, which don't overpass a width from 2 to 3 mm. Holotype PIZF 129 has a length of 25 mm and is divided in 33 clearly evidenced segments tapering continuously till crossing over after the anus in an appendix, the cirrus.
Form: Holotype PIZ 129 as well as in FP003 clearly evidence the homologously paired metameres that compose mostly the animal's body. All these somites bear a pair of metanephridia, used probably like excretory organs and also like gonoducts. The prostomium, holding the eyes and sensory palps, is not visible enough to define it well, whereas the clearly maintained apical jaw suggests that we have to do it with a predator. The stretched tentacles were probably supported by a prostomium. The final somite that bears the anus and cirrus is relatively well preserved. It could be established that this Triassic Polychaete differs

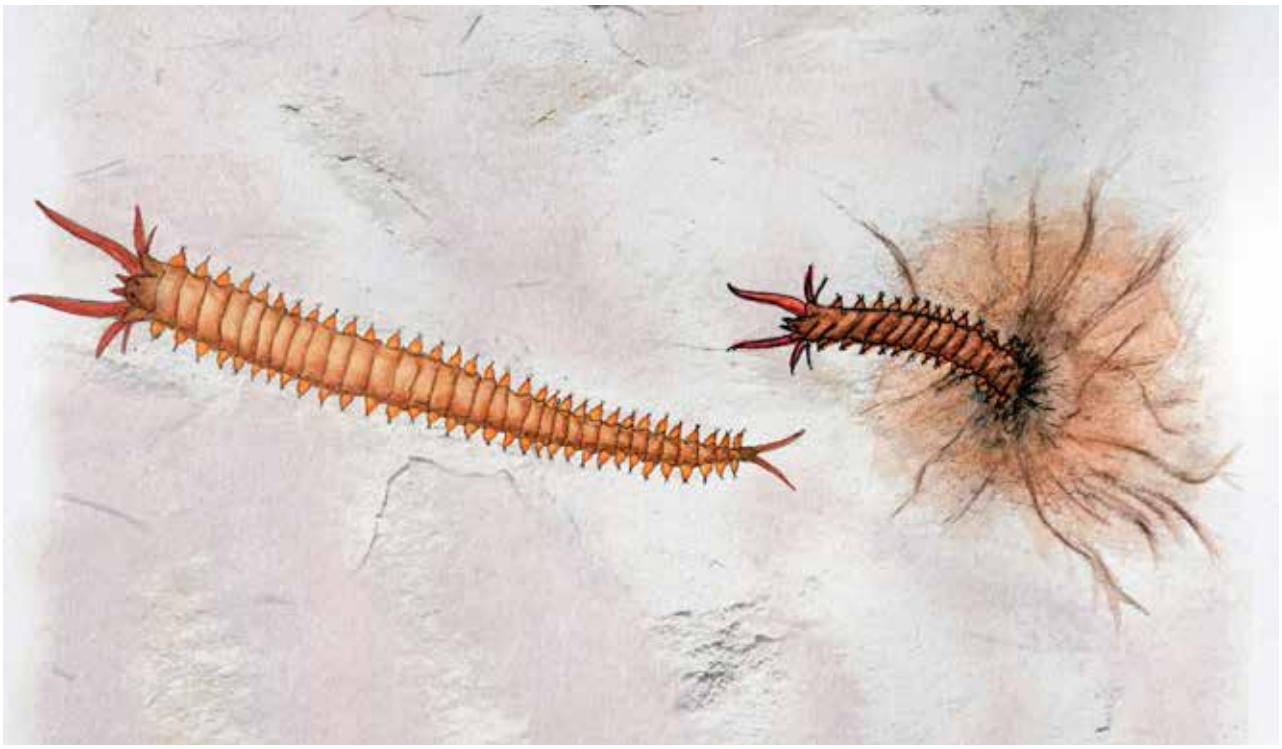
Drawing of *Burocratina kraxentrougeri,* made in the base of PIZF 129. Drawing Chiara Ghidoni



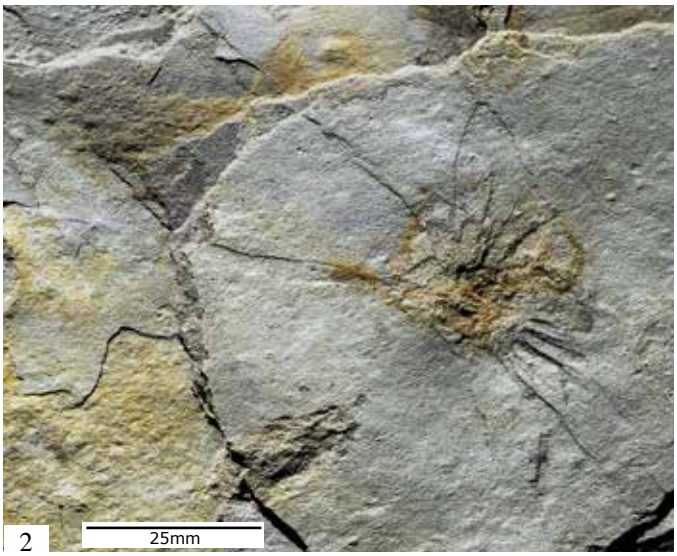
not much from the extant ones, and, therefore, we have to do it with a group of worms that reached its evolving stage early in their final body structure.

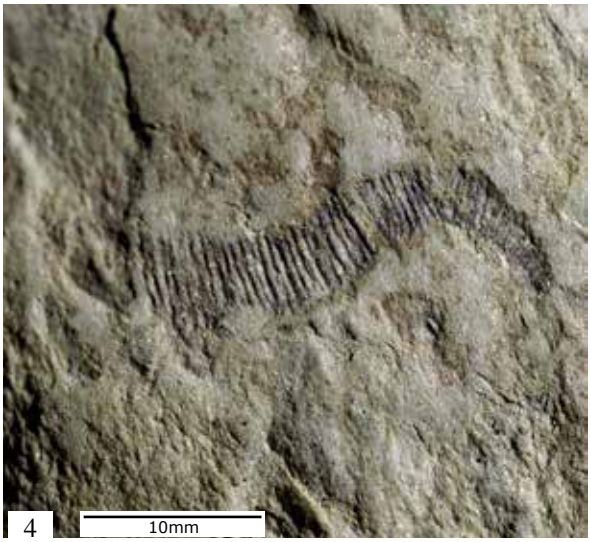
Discussion

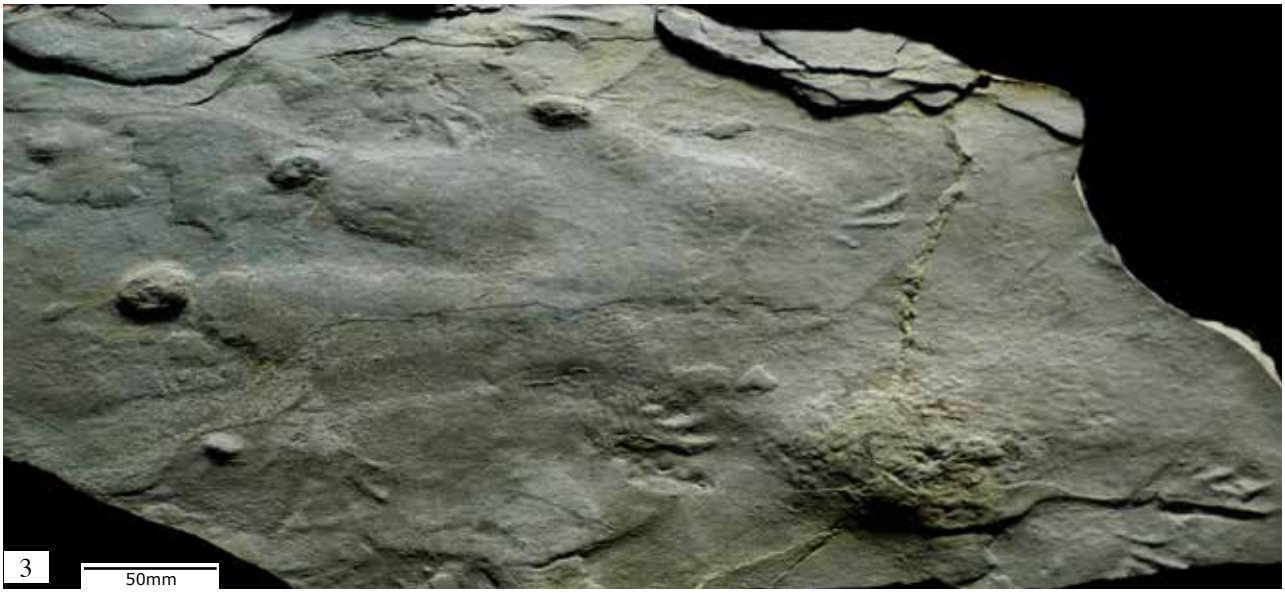
Today's Polychaetes are wormlike marine animals, usually with a length ranging from 5 to 10 cm, but some of them can measure also less than 3 cm. They belong to the class of Annelida, which comprises three orders of metameric worms: Archianellida (without parapodia and bristles), Errantia (with visible parapodia and prostomium different from other somites), and Sedentaria (benthic, sessile worms with regional specializations, often related to Lophophorates). They are metameric organisms, with a prostomium (which bears eyes, tentacles and sensory palps), a peristomium (the first somite, which bears a mouth and sometimes can also support bristles, palps and chitinous jaws in predator ones, or a tentacled crown in sedentary ones), and a pygidium, the final somite which bears the anus and cirrus (if present). Every somite carries two parapodia, composed of notopodium and neuropodium, that are supported by aciculae (stout supportive chaetas found internally in projecting parapodial rami).
Mostly of the extant polychaete are detritivores, filter feeder or predators – the last group holding usually chitinous jaws. In that manner, we can define *Burocratina kraxentrougeri* as an errant polychaete, probably a predator, living mostly in its benthic habitat. Due to their soft-bodied organisation,



Reconstruction of the habitat of *Burocratina kraxentrougeri,* based on slab PIZF 129 with burrowing traces in the fine sediment. Drawing Chiara Ghidoni







1) PIZF 129. *Burocratina kraxentrougeri.* Holotype

1) PIZF 129. *Burocratina kraxentrougeri.* Holotype. Characteristic are also the typical burrows occurring in vicinity.

3) FP003. *Sphingopus ladinicus* ichnosp. with trampled polychaete *Burocratina* on the heel

4) FP003. Detail of 3) evidencing the trod polychaete.

the fossil record is only poorly marked and this Middle Triassic Polychaete deposited in an extremely fine mudstone helps to understand their evolving phases between Cambrian and present.

Author Contributions

The present paper derives from the following work of the authors: Michael Wachtler has discovered the site and collected the specimens and Chiara Ghidoni has collaborated in the elaboration of the data and made the drawings. They wrote the paper together.

References

Abel O., 1926. Der erste Fund einer Tetrapodenfährte in den unteren alpinen Trias. Paläontologische Zeitschrift, 7: 22-24

Avanzini M., Gianolla P., Neri C., 2007.Conglomerato di Richthofen – Carta Geologica d'Italia – 1 :50.000, Catalogo delle Formazioni, Unità tradizionali. APAT, Dipartimento Difesa del Suolo, Servizio Geologico d'Italia. Quaderni serie III, 7, Fascicolo VII: 42-48. (http://www.accordo-carg.it/nomi_tradizionali.html).

Avanzini M., Wachtler M., 2012. *Sphingopus ladinicus* isp. nov. from the Anisian of the Braies Dolomites (Southern Alps, Italy). Bollettino della Società Paleontologica Italiana 51: 63-70

Bechstädt T.H., Brandner R., 1970. Das Anis zwischen St. Vigil und dem Höhlensteintal (Pragser und Olanger Dolomiten, Südtirol). Festband Geologisches Institut, 300-Jahr-Feier Univ. Innsbruck: 9-103

Delfrati L., Farabegoli E., 2000. Calcare di Morbiac. In Delfrati L., Falorni P., Groppelli G. & Pampaloni R. (eds), Carta Geologica d'Italia – 1:50.000, Catalogo delle Formazioni. APAT, Dipartimento Difesa del Suolo, Servizio Geologico d'Italia. Quaderni serie III, 7, Fascicolo I: 154-160

De Zanche V., Franzin A., Gianolla P., Mietto P. & Siorpaes C., 1992. The Piz da Peres section (Valdaora-Olang, Pusteria Valley, Italy). A reappraisal of the Anisian stratigraphy in the Dolomites. Eclogae Geologicae Helvetiae, 85 (1): 127-143

Glasby C.J., Fauchald, K,. Hutchings, P.A., 2000. www.annelida.net/nz/Polychaeta/ReferencesNZPolyGlossaryV1.htm

Renesto S., Posenato R., 2003. A new lepidosauromorph reptile from the Middle Triassic of the Dolomites (northern Italy): Riv. It. Paleont. Strat. 109: 463-474

Riedl R., 1983. Fauna und Flora des Mittelmeeres. pp. 398-409

Todesco R., Wachtler M., Kustatscher E. & Avanzini M., 2008. Preliminary report on a new vertebrate track and flora site from Piz da Peres (Anisian–Illyrian): Olang Dolomites, Northern Italy. Geo Alp, 5: 121-137

Wachtler M., 2012. The genesis of plants. Preliminary researches about the Earl-Middle Triassic Fossil Floras from the Dolomites. A Compendium. DoloMythos, Innichen. South Tyrol. pp. 1-224