



## Taxonomic study of brachiopods (Lingulidae) from Lontras Shale, Paraná Basin, Brazil

Joany D. O. Silva\*, Carolina Zabini, Luiz C. Weinschütz.

### Abstract

The Lingulidae Family (lingulides) are brachiopods with chitinofosfatic shells. The Brachiopoda are marine invertebrate animals with distinct and symmetrical bilateral valves. These lingulides specimens were collected at the Campáleo outcrop, Lontras Shale (Lower Permian) from Itararé Group, located in Mafra, Santa Catarina, Brazil. This black shale has a huge fossil record with excepcional preservation. In this research, we identify and analyse the variety of the fossil lingulides of the Paraná Basin.

### Key words:

Lingulide, Itararé Group, Permian.

### Introduction

Lingulides are organisms that belong to Lingulidae, which is a family of the Brachiopoda Phylum. This group is characterized by benthic animals with distinct shells: ventral (pedicular) valve and dorsal (brachial) valve. Almost all species are represented by fossils, although there are extant genus in nowadays seas. The specimens may have oval to subrectangular shell and some specific internal features to be classified as Lingulidae such as assymetrical muscular system with internal oblique muscles and unpaired posterior adductor muscle<sup>1</sup>.

The lingulide fossils analysed in this work were collected at Campáleo outcrop, in the city of Mafra, Santa Catarina, Brazil. This outcrop belongs to the Lontras Shale (Lower Permian) and Upper Campo Mourão Formation, eastern border of the Paraná Basin. The Campáleo outcrop is recognized by their enormous and extremely preserved fossil record of many groups of organisms<sup>2</sup>.

This research have the purpose of describe the lingulides species that occur in the Permian of the Paraná Basin.

### Results and Discussion

The specimens were observed and some characteristics were considered such as: type of the valve, external shape, presence of muscle scars, length, width, W/L ratio, umbonal region, concentric growth lines and other structures. All the valves were photographed and recovered with ammonium chloride to highlight these features.

Considering the 64 valves analysed, 53% are ventral valves and 47% are dorsal valves. This shows that the sampling is highly equilibrated. When we correlate the width with the length, we can see that the size of most specimens are very similar.

It is possible to see that the umbonal region is high and triangular with vestigial propleas. The pedicle nerve impression of the ventral valve (image 1) is also preserved. According to the literature, this characteristics resemble *Langella sp.* (Mendes, 1961). This genus is formed by fossil organism with size smaller than 1 cm. Their ventral

valve have a high and triangular cardinal area with a pedicle nerve impression. The dorsal valve have a median beak and the posterior margin is rounded<sup>1</sup>.



**Figure 1.** CPI 469: Internal mould of a ventral valve with pedicle nerve impression and vestigial propleas.

### Conclusions

There are strong evidences that the lingulides from the Lontras Shale belong to *Langella sp.* (Mendes, 1961), based on their size, shape and internal features. In this specimens, muscle scars were not available but it is important to improve more taxonomic lingulide studies using muscular morphology when possible.

### Acknowledgement

My sincere acknowledgement goes to PRP Unicamp and FAPESP 2017/10956-5 for funding this research.

1. Emig C. C. Proof that *Lingula* (Brachiopoda) is not a living-fossil, and emended diagnoses of the Family Lingulidae. *Carnets de Géologie/Notebooks on Geology*, Maintenon, Letter **2003/01**.

2. Ricetti, J. H. Z. ; Schneider, J. W.; Ianuzzi, R. e Weinschutz, L. C. *Anthracoblattina mendesi* Pinto et Sedor (Blattodea, Phylloblattidae): The Most Completely Preserved South American Palaeozoic Cockroach. *Rev. bras. paleontol.* **2016**, 19(2):181-194.