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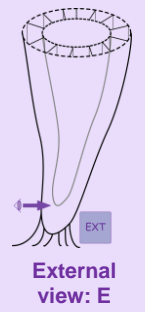


Archaeocyathan knowledge base: influence of the sections orientation for identification



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Specialists of Cambrian studies may encounter in their researches some Archaeocyatha remains. As these fossils are an important group, an accessible tool appears essential for their identification. Archaeocyaths must be imperatively studied in oriented thin sections. Keys, easy to use and adapted even to incomplete specimens, were lacking before 2011, when a knowledge base was established using the software XPER² (fig.1). Checkbase, an XPER² tool, allows the automatic testing of the genera discrimination.



External view: E

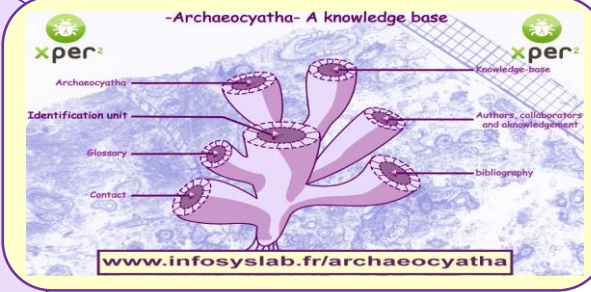
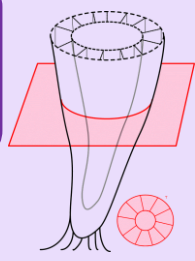


Figure 1: Homepage of archaeocyathan website

Problem

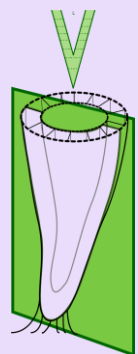
- Fossils are examined through oriented thin sections.
- Transverse sections are easily found contrary to longitudinal ones.
- What is the influence of the thin section orientation during the identification process?



Transverse section: T

Method

- Archaeocyathan knowledge base comprises the 307 valid genera described with 120 descriptors.
- Checkbase (Xper² tool) compares all couples of genera (fig.2A&C)
- Then each genus is assigned to a single category: *not discriminated*, *may be discriminated*, *discriminated* (fig.2B)



Longitudinal section: L

Results

- We analyze genera discrimination focusing on the different sections (graph 1).
- ~44% not discriminated in transverse section.
- ~90 % discriminated with a transverse and a longitudinal sections.
- >95% discriminated with an oblique section.

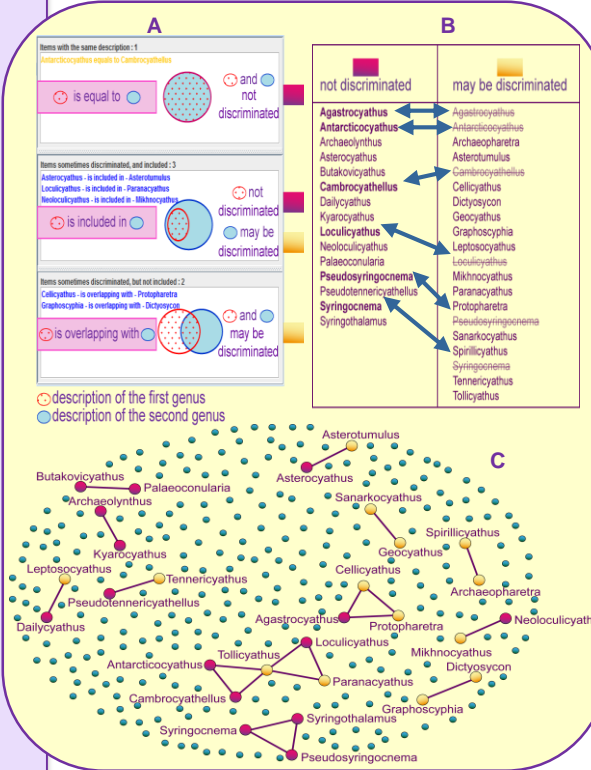
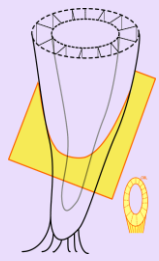


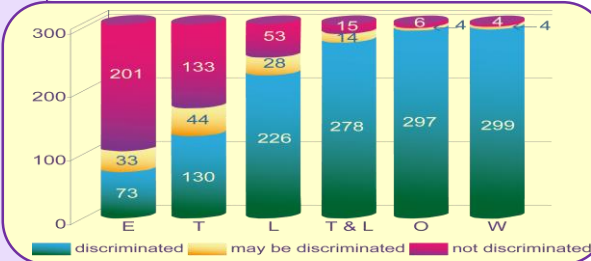
Figure 2: in longitudinal and transverse section
A. Example of Checkbase output
B. List of genera from Checkbase
C. Discrimination graph

Advice

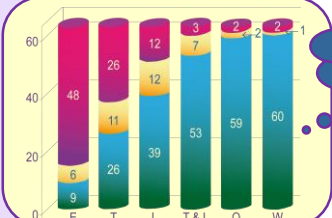
- A single oblique section is the most efficient for discrimination: all structures are visible but their shapes are difficult to recognize.
- Traditionally, it is advisable to use a transverse AND a longitudinal section: discrimination is lower efficient but characters interpretation is easier.
- Practically, longitudinal sections are difficult to find.
- New recommendation to prepare samples: When a longitudinal section is not seen, redirect the transverse section to make an oblique.



Oblique section: O



Graph 1: Discrimination of genera according to the orientation of the section(s)
W: witness = entire morphological knowledge base



What about the genera with a stratigraphical interest ?

Graph 2: discrimination of genera with stratigraphical interest only