ACTA PALAEONTOLOGICA POLONICA

Biotic interaction between spionid polychaetes and bouchardiid brachiopods: Paleoecological, taphonomic and evolutionary implications

Sabrina C. Rodrigues, Marcello G. Simões, Michał Kowalewski, Mônica A.V. Petti, Edmundo F. Nonato, Sergio Martinez, and Claudia Julia del Rio
Acta Palaeontologica Polonica 53 (4), 2008: 657-668 doi:http://dx.doi.org/10.4202/app.2008.0410

Shells of *Bouchardia rosea* (Brachiopoda, Rhynchonelliformea) are abundant in Late Holocene death assemblages of the Ubatuba Bight, Brazil, SW Atlantic. This genus is also known frommultiple localities in the Cenozoic fossil record of South America. A total of 1211 valves of *B. rosea*, 2086 shells of sympatric bivalve mollusks (14 nearshore localities ranging in depth from 0 to 30 m), 80 shells of *Bouchardia zitteli*, San Julián Formation, Paleogene, Argentina, and 135 shells of *Bouchardia transplatina*, Camacho Formation, Neogene, Uruguay were examined for bioerosion traces. All examined bouchardiid shells represent shallow−water, subtropical marine settings. Out of 1211 brachiopod shells of *B. rosea*, 1201 represent dead individuals. A total of 149 dead specimens displayed polychaete traces (*Caulostrepsis*). Live polychaetes were found inside *Caulostrepsis* borings in 10 life−collected brachiopods, indicating a syn−vivo interaction (*Caulostrepsis* traces in dead shells of *B. rosea* were always empty). The long and coiled peristomial palps, large chaetae on both sides of the 5th segment, and flanged pygidium found in the polychaetes are characteristic of the polychaete genus *Polydora* (Spionidae). The fact that 100% of the *Caulostrepsis* found in living brachiopods were still inhabited by the trace−making spionids, whereas none was found in dead hosts, implies active biotic interaction between the two living organisms rather than colonization of dead brachiopod shells. The absence of blisters, the lack of valve/site stereotypy, and the fact that tubes open only externally are all suggestive of a commensal relationship. These data document a new host group (bouchardiid rhynchonelliform brachiopods) with which spionids can interact (interestingly, spionid−infested sympatric bivalves have not been found in the study area despite extensive sampling). The syn−vivo interaction indicates that substantial bioerosionmay occur when the host is alive. Thus, the presence of such bioerosion traces on fossil shells need not imply a prolonged post−mortem exposure of shells on the sea floor. Also, none of the Paleogene and Neogene *Bouchardia* species included any ichnological evidence for spionid infestation. This indicates that the Spionidae/ *Bouchardia* association may be geologically young, although the lack of older records may also reflect limited sampling and/or taphonomic biases.

Key words: Brachiopoda, Spionidae, *Caulostrepsis*, *Bouchardia*, biotic interaction, bioerosion, Cenozoic, Brazil

Sabrina Rodrigues [scoelho@ibb.unesp.br], Marcello Simões [btsimoes@ibb.unesp.br], Departamento de Zoologia, Instituto de Biociencias Distrito de Rubiao Junior s/n CxP 510 18618-000 Botucatu, SP Brazil; Michał Kowalewski [michalk@vt.edu], Department of Geosciences, Virginia Polytechnic Institute and State University Blacksburg, USA; Mônica Petti [mapetti@usp.br], Edmundo Nonato [efnonnato@io.usp.br], Departamento de Oceanografia Biologica, Instituto Oceanografico, Praça do Oceanografico, 191 05508-120 São Paulo, SP Brazil; Sergio Martinez [smart@fcien.edu.uy], Facultad de Ciencias, Inguá 4225, 11400 Montevideo, Uruguay; Claudia del Rio [cdelrio@macn.gov.ar], Museo Argentino de Ciencias Naturales Bernardino Rivadavia, División Paleoinvertebrados, Angel Gallardo 470, Buenos Aires, Argentina.

This is an open-access article distributed under the terms of the Creative Commons Attribution License (for details please see creativecommons.org), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Full text (480.5 kB)