Trematode dynamics through time and space in Holocene sedimentary successions of the Po Basin, Italy

Michele Azzarone *†[1], Daniele Scarponi [1], John Huntley [2], Rafal Nawrot [3], Alessandro Amorosi [1], Monica Caffara [4], Andrea Gustinelli [4], Michał Kowalewski [3]

[1] Dipartimento di Scienze Biologiche, Geologiche e Ambientali, University of Bologna, Bologna, Italy
[2] Department of Geological Sciences, University of Missouri – 101 Geology Building, Columbia, MO, United States
[3] Florida Museum of Natural History, University of Florida – 1659 Museum Rd., Gainesville, FL, United States
[4] Dipartimento di Scienze Mediche Veterinarie, University of Bologna – via Tolara di Sopra 50, Ozzano Emilia, Italy

Holocene brackish succession (core 204S7) of the Po Plain revealed a recurrent association between increases in parasite prevalence (trematodes traces on the valves of *Abra segmentum)* and parasequence bounding surfaces. Here we expand the investigation of trematode parasitism in bivalve species to a ˜25km down-dip cored transect iñ the Po Plain, which crosses different paleo-environments: brackish (core 204S7), nearshore (core 205S6), and nearshore to proximal marine (core 205S14). Non-Metric multidimensional scaling (nMDS) is applied to investigate main drivers of mollusk turnover and highlight the primary Holocene sedimentary packages of Po plain stratigraphic architecture. The faunal turnover along the nMDS major axis expresses the combined effect of salinity and bathymetry, highlighting alternating periods of rapid flooding and gradual shallowing (i.e., meter-thick parasequences). The results are generally consistent with previous interpretations and largely invariant to spatial and taxonomic scales of the analysis. Parasite prevalence in individual samples displays a high temporal variability across all the investigated cores and an overall decreasing trend seaward. Single-sample values in *A. segmentum* range from 7% to 70% in core 204S7 and 8% to 53%, in core 205S6. Along core 205S14, *Donax semistriatus* prevalence ranges from 17% to 33%. Four flooding surfaces highlighted by fossil ordination outputs have been recognized in core 204S7. Three of them are associated with significant peaks in prevalence (i.e. outside the 95% randomization confidence interval) for *A. segmentum* (at 12.3m, 10.3m and 9.3m core depth) and *Loripes orbiculatus* (at 12.3m core depth). Along the core 205S6, statistically significant prevalence peaks for *Lentidium mediterraneum* (18.0m and 10.9m core depth) and *Chamelea gallina* (13.2m core depth) coincide with three of the six centennial-scale flooding surfaces recognized. Along core 205S14 mollusc turnover highlights three flooding surfaces only (28.0m, 25.6m and 25.1m core depth), which are not associated with statistically significant prevalence peaks among the investigated samples. In conclusion, the recurrent association between flooding events and surges in trematodes infestation appears restricted to brackish and nearshore settings. Nevertheless, these evidences suggest that anthropogenic sea-level rise may have led to significant alterations in host-parasite interactions along a wide spectrum of coastal ecosystems.

* Speaker
† Corresponding author: michele.azzarone2@unibo.it