Characterization of Pleurobema Rubrum Shells

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SHELL BACKGROUND

• Freshwater bivalves have shown promise as biological indicators for studying climate and water conditions through study of the annual growth bands of their shell growth.
• Variations in growth band width inform climatic considerations such as growth season length and temperature changes.
• Trace levels of other compounds may be incorporated into calcium carbonate matrix of shell during growth, which may be useful in monitoring pollution levels in lakes or rivers.

LOCATION/TIME PERIODS

Four Pleurobema rubrum shells, a species of freshwater mussel found near the Green River in Kentucky, were selected from archaeological and historic sites for study.

Sites of shells
• DeWeese shell mound
• Annis mound
• Baber Hotel

Time periods of focus
• Late Archaic (~3000-1000 BC)
• Mississippian (~1100-1450 AD)
• Early 19th century (1830-1840)

RESULTS

• Identified and prepared historic/prehistoric shells for cross-sectional analysis using optical/electron microscopy for annual growth band width measurements.
• Expected downward trend in band width overshadowed by yearly growth variations, likely due to shorter life-spans.
• Elemental analysis was performed via EDS and scanning micro-XRF with most of the shell being CaCO3.
• Trace levels of Mn were also found which varied between growth bands and within a single band.
• Mn concentration in the CaCO3 structure has been shown to correlate with an increase in biological or organic material in the water habitat as well as decreased shell growth rates in winter.

CONCLUSION

Graph of annual growth band width trends. The growth trend of shells should be decreasing however, DeWeese shell 2 is the only one that seems to fit the trend.

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