

BIOGEOCHEMICAL SIGNATURES OF MARINE AND ESTUARINE BIVALVES

Implications for Interpreting Seasonality at Shell Midden Sites Using High-Resolution Stable Isotope Sclerochronology

Meghan Burchell, Nadine Hallmann, Bernd R. Schöne, Aubrey Cannon, and Henry P. Schwarcz

SUMMARY

The chemical and biological analyses of archaeological shells from shell midden sites can reveal important information regarding local ecology, environmental and climatic changes, seasonality, and the intensity of shellfish gathering. Most archaeological studies that seek to identify shellfish seasonality use low-resolution methods such as the presence or absence of “winter lines.” Studies that apply stable isotope analysis may present a higher seasonal resolution; however, a critical examination of these studies demonstrates the lack of precise sampling and sufficient analysis of modern species that reduces the overall precision of the seasonal estimate. This chapter discusses the history of seasonality research in shellfish, and presents a case study comparing low- versus high-resolution analyses of modern shellfish from the coast of British Columbia. While this chapter does not provide any archaeological data, it does illustrate the importance of fully understanding the biology and chemistry of the shellfish species in question through isotope-sclerochronology, prior to attempting to identify seasonality through light stable oxygen isotopes or growth lines and/or increments.

INTRODUCTION

The question of seasonality is often cited as central in understanding subsistence strategies in prehistoric economies (Andrus and Crowe 2000; Coutts and Higham 1971; Harrison 1988; Kennett and Voorhies 1996; Killingley 1981; Lieberman 1993). Although these studies state that seasonality is an important factor, some tend to neglect to explain *why* it is important. Gregory G. Monks (1981, 177) notes

that there is “no overall rationale that is widely accepted in practices as to why seasonality studies should play a key role in archaeological research,” nor is there a “framework within which the results of individual methods of seasonality estimates can be integrated.” More than two decades have passed since this problem was noted, and yet very few archaeological studies have integrated what seasonal activities mean to the overall structure of a society, with some exceptions (including Atalay and Hastorf [2006]; Cannon [2002]; Lieberman [1993]; and Milner [2005]).

This chapter examines the current evidence for understanding the purpose of shellfish harvest and consumption in relation to the importance of seasonality. It will also review methods of examining seasonality based on the biological and chemical characteristics of mollusks. Understanding the seasonality of shellfish harvest and shellfish procurement strategies requires a multidisciplinary approach that can account for all of the variables influencing shellfish gathering (Cipriani, Antczak, and Antczak 2008, 248).

One of the most significant issues with seasonality estimates is defining a season and understanding the length of time within a year that a seasonal activity occurs. Contemporary concepts of seasons are broad periods of time, and identifying a season, such as “winter,” may be an inflation of the length of time over which the actual events took place (Milner 2005, 58). If the analytical resolution is not sufficient, the presence of a very precise seasonal indicator may result in exaggerating the duration of an activity. Seasonality interpretations based on mollusks are frequently based on sequential estimates, presented as spring, summer, winter, or fall (Monks 1981, 178), or as “cold” or