

Chapter 8

The Role of Life Cycle Characteristics in Harmful Algal Bloom Dynamics



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8.1 Introduction

Many phytoplankton species have multiphasic life cycles that include stages with different morphologies, behaviours, and functional roles. Studies of life cycles under controlled conditions in the laboratory, observations in species' natural environments, and model simulations have all provided valuable insights on species-specific bloom dynamics and associated impacts. This chapter presents an overview of the role that life cycles play in the bloom dynamics of representative, diverse, toxic harmful algal bloom (HAB)-forming taxa: specifically, the dinoflagellates *Pyrodinium bahamense* and *Alexandrium fundyense*, diatom species of the genus *Pseudo-nitzschia*, and the cyanobacterium *Nodularia spumigena*. These are among the most widespread harmful algal species described, causing a range of impacts from human illness and death from ingestion of potent toxins via the food chain to fish and wildlife mortalities and ecosystem disruption. There are many other HAB species that cause these and other impacts, but the four species highlighted here are selected because features of their life cycles are representative of many different HAB species that undergo sexuality or have resting stages in their

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