Early life of an inshore population of West Greenlandic cod Gadus morhua: spatial and temporal aspects of growth and survival

Understanding the processes that affect fish larval survival and recruitment is a fundamental tenant of fisheries science. Small, isolated fjords are ideal study systems for elucidating early life history processes, as population dynamics are well traced in these partially closed systems. We examined the distribution, growth and mortality of eggs and larvae of a fjord population of cod during a 5 mo field campaign in the fjord Kapisigdlit, West Greenland. Cod mainly spawned early in the season in the innermost shallow region of the fjord. Egg survival was generally high in the fjord. The high survival may have been driven by relatively high temperature and/or low predation in the inner region. Early in the season, the distribution of eggs and young larvae was mostly restricted to the spawning area. Later in the season, larger larvae had become more evenly distributed in the fjord. This shift in distribution was observed after the seasonal pulse in freshwater outflow following the ice break-up in Kapisigdlit River. There was a positive correlation between the amount of food in a larval stomach and growth, and larval growth was greater in the outer fjord where prey availability was higher. The timing between spawning and freshwater input may be essential for survival and recruitment, this ensuring low dispersal of eggs and younger stages and high dispersal of older, actively feeding stages. Therefore, cod in this area could be vulnerable to future climate change affecting the timing and magnitude of freshwater outflow, by changes in precipitation, temperature or prey availability.