

7 Reproduction and early life history

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INTRODUCTION

The sheer diversity of reproductive and life history strategies in fishes is astonishing, reflecting the size, shape, behaviour and life styles of about 32 000 species that swim in the world's oceans, lakes and rivers. Some species breed within months of hatching and live for perhaps a year; others take 10 years or more to mature and live for more than a century. Some produce one or two young, cocooned in elaborate egg envelopes; others produce millions of microscopic eggs that appear as planktonic clouds in the water. The parents of some species spend months caring for their eggs and young, using sophisticated methods such as mouth brooding or even head brooding; others broadcast their eggs into the currents like seeds in the wind, and have no further role in their fate. Fishes are unique among vertebrates in producing hundreds, thousands and even millions of young, even in a single breeding event. In so large a brood the chances of survival for individuals are small, yet some clearly do survive. Their numbers determine the strength of their cohort and the number of recruits to the adult population. Understanding how different combinations of biological characteristics and environmental conditions affect survival and recruitment is the holy grail of fisheries research, and many scientists have dedicated their careers to that end.

Clearly, for a population to persist the fishes must produce viable young that grow to sexual maturity and reproduce themselves. Most fish begin life as a *zygote* (a fertilised egg); the eggs may be attached to surfaces, deposited in nests crafted by their parents or cast into the water to fend for themselves. Life cycles vary among species (Fig. 7.1) but most include an *embryo* (from *zygote* to first feeding, with all nutrition from the yolk sac), the *larva* (from first external feeding to juvenile metamorphosis), the *juvenile* (from when fins and other structures are fully differentiated to sexual maturity), the *adult* (the period dominated by reproduction) and *senescence* (the post-reproductive period, characterised by slow growth, reduced intensity and frequency of spawning and degeneration).

During the life cycle, the most profound changes are in the early, post-hatching stages of life and are reflected in morphology, physiology, behaviour and ecology. In this period, the weight of a growing individual can increase one million times! Despite the importance of this period for conservation and management, there is a great deal we do not know about the early lives of Australian freshwater fishes. How and when do they spawn? How many eggs do they produce? Do they spawn once only in a season and then die, or do they spawn multiple times? Which species