6. Live feed production in South Australian aquaculture

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Over the past decade, the development of marine aquaculture has accelerated in South Australia (A$180 million in 1998–99) with a concomitant increase in production of live feed organisms. To date there has been little direct research focussed on live feed; however, a range of species are cultured in commercial facilities that have been established and which are now expanding their production capacity.

Conventional live feed organisms are cultured at abalone, bivalve and marine finfish hatcheries. Most abalone hatcheries settle larvae on plates conditioned to provide a film of seasonally occurring benthic diatoms, although some operators also introduce selected species (e.g. *Nitzchia* sp., *Naviculla* sp. or local isolates). Bivalve hatcheries utilise a range of microalgal species including small brown flagellates (*Isochryis* sp. 'Tahitian', *Pavlova lutheri*) and non-motile golden brown diatoms (*Chaetoceros calcitrans*, *Skeletonema costatum*, *Thalassiosira pseudonana*). The species composition fed depends on the stage of larval development. Marine finfish hatcheries use traditional live feed types with microalgae (*Nannochloropsis occulata*, *Tetraselmis* sp., *Isochrysis* sp. 'Tahitian', *Pavlova lutheri*) used as a component of feed and enrichment for rotifers, or for addition to larval rearing tanks in green- or brown-water larval culture methods. Large (*Brachionus plicatilis*) and small (*Brachionus rotundiformis*) strain rotifers are used as the first feed for marine finfish larvae followed by first stage (N1) or nutritionally enriched second stage (N2) *Artemia* nauplii hatched from cysts. In addition, Cognis Pty Ltd operate an extensive salt pond culture system on the northern approach to Whyalla to produce *Dunaliella salina*. Microalgae are harvested and processed to extract b-carotene.

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With the growing maturity of industry groups that use live feeds, it is expected that research will be required to meet commercial requirements related to cost reduction, production efficiency, culture stability and product quality.

Copepod culture continues to be problematic but promising. We expect that marine finfish hatcheries will adopt production technology that can provide improved production levels and demonstrate measurable benefits when incorporated into existing hatchery feeding protocols. Since 1997, a PhD research project undertaken by Amanda Caughey has investigated the population dynamics and species composition of microalgae and copepods in a temperate saline pond at Port Augusta, SA. This project has been sponsored by the Playford Memorial Trust Aquaculture Scholarship facilitated by the University of Adelaide, the Port Augusta Council and SARDI. The ultimate objective of this research is to develop a mass culture system for production of King George whiting larvae for aquaculture and stock enhancement. The results of these trials will be presented in Ms Caughey's thesis.

The use of saline groundwater for aquaculture has not been fully evaluated. Since 1997, a research project aligned to the Aquaculture CRC has been undertaken by the Coorong District Council and SARDI to develop a closed production system at the Bedford Groundwater Interception Scheme at Cookes Plains, SA. The objective of this research is to develop aquaculture production systems to assist reclamation of land affected by dryland salinity. At this site, snapper (*Pagrus auratus*), *Artemia* and *Dunaliella salina* have been cultured in tanks and lined ponds housed within polytunnels. All used water has been directed to evaporation ponds for salt production. In future, the use of *Artemia* within this system will be expanded to take advantage of their uses for nutrient harvesting, partial feed replacement for fish, and biomass and cyst production.