More than chance determines future for baby fish

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(PhysOrg.com) -- Baby fish may be able to resist ocean currents and influence how and where they move, says a Victoria University researcher, although he is yet to work out how they do it.

Dr Jeffrey Shima, director of Victoria's Marine Laboratory, is leading long-term research into understanding where baby fish—known as larvae—come from, where they end up, and what happens to them in between.

Dr Shima's Marsden funded research is being carried out in Wellington Harbour and on the capital's south coast, using the triple-fin, a small reef fish that is commonly found on shallow reefs and in tide pools.

He has pioneered a technique to work out growth rates, the age of the fish and the chemistry of the sea water they have been in by examining a sample the size of a grain of sand from within the ear bones of larvae.

That allowed him to conclude that where larvae develop is more important than where they are bred.

"Regardless of where they came from, the baby fish that ended up in Wellington Harbour grew faster and were more likely to survive," says Dr Shima. "The harbour is sheltered and also a rich source of food, making it a kind of micro-nursery."

With further Marsden funding, Dr Shima went on to find out more about

optimum breeding conditions for triple-fins.

"We wanted to know if there are similar nursery habitats on ocean coasts, within small eddies that are out of the fast moving currents and act as havens for baby fish."

The research team combined oceanographic modelling with field work, using a novel light trap box they designed, which was placed both in and outside of the eddies.

Dr Shima says data gained from the ear bones of the larvae is still being analysed but there are some surprising early results.

"Most of the fish seemed to be staying very close to the shore. Once we went a few hundred metres out into the ocean there were virtually no larvae."

He says that runs counter to a widely held view that fish larvae are washed out to sea and often drift in ocean currents for many weeks before being washed back in to a reef where they grow into adults.

"They seem to be doing something to keep themselves near the shore which suggests they can exert some control over what happens to them. Baby fish are good swimmers but not so good that they can out-swim the strong ocean currents in the Wellington region."

The findings are important because they bring scientists closer to understanding fish breeding patterns which is essential for managing fisheries and marine biodiversity.

Dr Shima says setting fish quotas is currently an imprecise science. "You can forecast population growth for many species quite accurately, but not with fish because the babies are dropped in to the ocean.

"There is a lot of guesswork in setting catch quotas because we really don’t know the size of fish populations."

Having plentiful triple-fin in the waters on their doorstep has made a big difference to the research team.

"I’m often asked why I don’t use species like snapper and blue cod. It’s because you rarely come across their babies in the wild. We would spend all our time looking for samples."

But, says Dr Shima, the results of his research are applicable to other species.

Provided by Victoria University