

Take-home tips for smarter prawning

Prawn farmers in Belize, Central America, have found a way to simultaneously triple prawn production and reduce the environmental impact of the production process. Australian scientists and prawn farmers are hoping to adapt and enhance the technology to increase production profits and meet ever-tightening environmental regulations.

According to CSIRO Marine Research ecologist Dr Michele Burford, the system developed by Belize Aquaculture Ltd is counterintuitive to conventional prawn farming. For example, farmers in Australia flush their prawn ponds with fresh seawater every few days to remove the nutrients and suspended solids left over from excess food, prawn waste and dead algal blooms.

But in Belize, the pond water is retained for the whole season, which lasts about four months. So how do they do it?

On a visit to Belize funded by AusIndustry, Burford, CSIRO chemist Peter Thompson, and Doug Pearson of the Australian Prawn Farmers Association, studied the system developed by Belize Aquaculture Ltd.

'Firstly, they've lined their ponds with black plastic and increased the amount of aeration,' Burford says. 'The aeration prevents a drop in oxygen as the algae, which gradually build up in the ponds, die.'

'It also keeps any solid waste suspended in the water column, so that the bottom of the pond, where the prawns spend most of their time, is much cleaner. And because the pond is lined with plastic, you don't get the

scouring effect from the aeration, as you would in an unlined pond.'

The next trick was to add pelleted chicken food and molasses to the pond. These act as a supply of carbon to encourage the growth of bacteria. Eventually, large clumps of bacteria appear, big enough for the prawns to eat. These microbial munchies supplement the prawns' diets, enabling the farmers to reduce the amount of nitrogen in the prawns' feed and therefore the amount of nitrogenous waste.

At the end of the season, after the prawns are harvested, the nutrient-rich pond water is pumped into settlement ponds where the solid waste is allowed to settle. The water is then reused for the next batch of prawns.

Burford says lining ponds with plastic and boosting aeration is expensive. But Belize Aquaculture Ltd gets around this problem by increasing stocking densities.

Instead of the 30–40 prawns a square metre typical in Australian ponds, the Belize group was able to stock 100–130 prawns a square metre, resulting in harvests of 15 tonnes a hectare. So the extra cost was offset by a larger harvest.

'What makes the Belize system work is that they've made improvements in all areas of the production system,' Burford says. 'The animals are selectively bred and well adapted to the system, the pond conditions and treatment methods are improved, and they use low protein food. If you tried to do just one of those things, without the others, the whole system would fall over.'

Burford says Australian prawn farmers are keen to develop this technology for three main reasons: increased profitability, biosecurity – that is, less chance of contamination or disease entering or leaving ponds – and to meet environmental regulations.

'These regulations are getting stricter and they're starting to constrain growth of the industry. But this technology could provide a win-win solution,' she says.

In Australia, one of the first tasks would be to identify a suitable prawn species on which to trial the technology. Belize Aquaculture used a white shrimp (*Litopenaeus vannamei*) not found in Australia, but our banana prawn (*Penaeus merguensis*) may prove suitable.

Further down the track, the project would look at better feeds and feeding strategies, stocking densities, and sophisticated engineering solutions to remove nutrients from wastewater.

Burford stresses that the project will not simply transfer the Belize technology to Australia, but will adapt and improve on the concepts to develop a style suitable for Australian prawn farming.

'We're keen to help and encourage the industry not to ride on the coat-tails of someone else's technology, but to take some of the good ideas from it and go one step further,' she says.

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Australian growers and researchers are looking to a prawn-farming system developed in Belize for tips on sustainable expansion.