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The breeding program of Asian sea bass in Singapore

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The Asian seabass (*Lates calcarifer*) is an important marine food fish species and has been cultured in Southeast Asia since the 1980s. The aquaculture industry of this fish is growing rapidly. In Singapore, with the support from Singapore government, we have started a breeding program forAsian seabass to improve itsgrowth performance, disease resistance and meat quality since 2004. After two generations of phenotypic selection with help of quantitative genetics, we have increased the growth of Asian seabass by over 40% as compared with the control. Using molecular parentage analysis and challenge of offspring from mass crosses with viral and bacterial pathogens, we have identified fish resistant to big belly disease, nodavirus and iridovirus. We have established one line of Asian seabass resistant to these diseases. Using QTL mapping, we identified DNA markers associated with growth and meat quality traits, and established one line for quick growth and another line for high content of omega-3s in flesh. In addition, we have developed a number of genomic resources to facilitate the breeding program, such as DNA markers, a molecular parentage system, linkage maps, BAC libraries, transcriptome and draft genome sequence. In this presentation, the author will show some details of breeding program and its achievements, as well as the future directions of research.

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Design and impact of eco-friendly and practical solutions to excluding predatory birds and diving ducks from cultured mussel lines and shrimp ponds

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Shellfish production has been increased since the 80s, along with some innovative improvements in technology to match. In particular, mussel longline and shrimp pond culture are volume products well suited for extensive areal expansion, which in turn provides attractive opportunities for birds that prefer this abundant high density prey. Until now, eco-friendly exclusion methods wereunknown and seabird predation has been on the rise with established mussel farms literally gobbled up by diving ducks within weeks, leading to permanent closures, as witnessed in Scandinavia, UK and Canada. Large scale shrimp farms have been increasingly predated on by thousands of birds leading to increased risk of disease transmission, higher production and feed costs, and expensive deterrents requiring vigilance and maintenance. While conventional acoustic methods, firearms and boats have temporary effects on scaring birds, mussel growers who installed submerged nets to surround large offshore sites have either been successful or been convicted for using the wrong mesh type. A scientific approach to designing nets based on eider duck behavior was the spark for a Norwegian-Canadian investigation into predation under controlled settings. Eiders select mussels by size and quality with a preference for cultured over wild, and could be excluded with the right mesh or a spiked grow-out rope. In parallel, an innovative laser light is proving to be an effective eco-friendly deterrent to birds feeding on mussels and shrimp. These three solutions are explored as practical solutions to reducing bird predation on mussel and shrimp farms, with potential application to other species.

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