



Development of Soy-Based Feeds for White Seabass and Yellowtail

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White seabass (WSB; *Atractoscion nobilis*) and California yellowtail (YT; *Seriola lalandi*) are highly-valued commercial and sport fish in southern California and are considered an excellent food fish (see Figure). WSB commonly occur from northern Baja California, Mexico, to Point Conception, California, USA. They are currently cultured by Hubbs-SeaWorld Research Institute (HSWRI) for stock enhancement. The hatchery in Carlsbad, California, is capable of producing an excess of fingerlings required for the stock enhancement program, and there is great potential and interest in the commercial culture of the species in offshore net cages. HSWRI is also currently culturing YT to market size in offshore cages in northern Baja California, Mexico. Great potential exists to expand commercial culture in both northern Baja California, Mexico, and Southern California.

The use of alternate sources of protein such as soybean meal could greatly improve profitability, while simultaneously addressing issues associated with the long term sustainability of fish meal and fish oil resources. Within the existing stock enhancement project, WSB are cultured to an average size of 20-25 cm using a commercially-available diet, while YT are in the family Carangidae, or jacks, and typically require high levels of high-quality fish-based protein in the diet. Therefore, a good opportunity exists to demonstrate the effectiveness of diets based on soy protein in the rapidly developing offshore aquaculture industry in this region.

Research conducted in 2008 and 2009 consisted of a series of growth trials with WSB and YT. Initial trials were designed to develop a basic practical diet that could then be utilized to identify upper limits for the inclusion of soy products and minimal levels of fish meal. Using the initial formulations, we identified practical levels for lipid and dietary protein. Work in 2009 was designed to identify limiting amino acids (lysine, methionine) or amino acid-like compounds (taurine) in high soy diets. We have been able to develop a practical research diet formulated to contain 40% protein and 10% lipid for WSB and 48% protein and 14% lipid for YT. Using the developed diet, we have identified that we can reduce fish meal from 55% of the diet to around 10-20% of the diet for both species using soy as the replacement protein. After evaluation of methionine, lysine and taurine supplements it appears there is a strong response to taurine and a weak response to methionine which appearing to be limiting nutrients for both species. Work in 2010 is designed to determine actual requirement of limiting amino acids. The first trial in 2010 with WSB utilized a series of diets with graded levels of taurine up to 0.5% inclusion. Growth did not plateau so a second trial is planned to evaluate levels of taurine up to 1.2% inclusion.

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