

Introduction of Soybeans and Field Peas for Culture of Yellow Perch

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High-quality, locally-grown protein sources, such as soybeans and field peas, may be used as a feed ingredient for a high-profit, high-demand fish such as yellow perch, and may help foster alternative markets for these crops and help diversify North Dakota aquaculture production. Traditional fish feeds are based on animal proteins. Tightening supplies of traditional materials and a desire to expand utilization of plant-based proteins are the basis for this investigation. Fish typically convert feed to body mass at a rate of one pound of feed to one pound of body mass. For example, based on a diet consisting of 45 percent soybean meal or field peas, it would require 45 pounds of soybean meal or field peas to raise 100 pounds of perch. If the 50 million pound per year deficit of yellow perch which exists in the Great Lakes region were being fed on a diet of 45 percent soybean or field pea meal, demand would be created for 22.5 million pounds of either meal.

A series of rations were formulated using predetermined levels (20%, 40%, 60%.) of soybean meal and field pea. Soybean meal obtained from solvent extraction was used based on data obtained from previous tilapia feed trials at the CREC Northern Aquaculture Center (Jarvis, et al. 1999). The control diet was an animal protein-based trout crumble manufactured by Nelsons and Sons Inc.

Fish were stocked at a rate of 100 fingerlings per tank. Each tank was maintained at an optimum temperature of 70-72° F. Water parameters such as pH, temperature, and un-ionized ammonia levels were officially recorded weekly. A photoperiod of 16:8 (Stickney) was maintained to provide optimum growth conditions. The feeding regimen was twice daily, a.m. and p.m., with each treatment fed to satiation. The total amount of feed fed to each replicate was recorded daily. Fish were weighed once each month. Any mortalities were also recorded. At trial termination all fish were weighed and counted in each replicate. Diets were formulated and balanced by Dr. Paul Brown., Purdue University, Department of Forestry and Natural Resources. Pelletized diets were manufactured by Dr. Kim Koch, NDSU Northern Crops Institute.

This study, which compares soybean and field pea as primary protein sources in perch diets, has just recently been completed. Although statistical analysis is incomplete, a number of trends are apparent. The feed conversion ratios are lower than expected and achieved in earlier research. These conversion ratios were consistent between the plant-protein based diets and the control. Lower feed conversion ratios may have been due to a negative interaction between the feeds and the biological filtration system. Diets that included 20% field pea or 20% soybean meal appear to have resulted in the highest weight gains and feed conversion ratio compared to the commercial control diet. Complete analysis will be forthcoming, however, preliminary data indicates that these plant-based diets are suitable substitutes for animal-based diets.