Effect of 10 generations of selection on growth, feed efficiency, processing and lipid traits in rainbow trout fed a standard or a "future" fish-free, soy-free diet

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EFFECT OF 10 GENERATIONS OF SELECTION ON GROWTH, FEED EFFICIENCY, PROCESSING AND LIPID TRAITS IN RAINBOW TROUT FED A STANDARD OR A "FUTURE" FISH-FREE, SOY-FREE DIET.

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There is limited scientific evidence of the real efficiency of selective breeding in aquaculture on the medium term. Meanwhile, aquafeeds are rapidly evolving towards plant-based diets. We compared a rainbow trout line selected for fillet production (improved growth, carcass yield and fillet fat) for ten generations (G10) with an unselected control line from the same base population (G0). Those were compared till 1.6 kg and two feeds were compared across the two lines from 264 to 374 dph. One was a commercial standard, the second was a "future" feed devoid of fishmeal, fish oil and soy, with microalgal biomass as a source of DHA. The G10 was improved relative to G0 for body weight (+61%), feed conversion ratio (-17 to -20%), fillet fat (+28-53%) and carcass yield (+4.2%), but not for fillet yield nor survival. Both feeds had similar performance in terms of growth, but the future feed showed a higher FCR, probably due to a feed intake measurement issue. Fish had a good EPA+DHA content (>1.2 g/100 g wet weight) with both feeds, partly linked to endogenous synthesis of these fatty acids. There was little if any genotype by feed interaction. This study shows that selective breeding can produce fast growing, feed efficient and thus more sustainable fish. In addition, fast-growing, highly nutritious fish can be produced without using any fish meal, fish oil or soy-based product.

This project received funding from the European Union's Horizon 2020 R&I program (GA 818367 – AquaIMPACT).