Chapter 15

Fishy Business: Genetic Engineering and Salmon Aquaculture

Rebecca Clausen[1], Stefano B. Longo[2], Brett Clark[3]

[1]Fort Lewis College, Department of Sociology, Durango, CO, USA; [2]North Carolina State University, Department of Sociology and Anthropology, Raleigh, NC, USA; [3]University of Utah, Department of Sociology, Salt Lake City, UT, USA

INTRODUCTION

The AquAdvantage salmon is poised to become the world's first genetically engineered animal for human consumption. It is a patented fish created and owned by a leading aquaculture technology corporation. The species has been genetically altered so that the fundamental traits and characteristics of an Atlantic salmon are blended with an eel-like species called the ocean pout and a salmon native to the Pacific Ocean, the Chinook. The result is a fish that grows at twice the rate of Atlantic salmon, enabling it to reach a harvestable size in 18 months instead of 3 years. While genetically engineered plants have been readily produced and consumed in the United States, genetic modification of animals represents the next step in the production of genetically engineered foods for human consumption. Thus, the aquaculture industry and corporate investors are championing this development in food biotechnology, as the approval of a genetically modified animal species for human consumption will create new opportunities for profit in this realm of production.

As the AquAdvantage salmon nears its regulatory approval, groups within both public and private sectors have put forward coordinated opposition. In 2014, California Governor Jerry Brown signed a ban on commercial production of genetically modified salmon anywhere in the state (Gutierrez, 2014

Genetically Modiþed Organisms in Food http://dx.doi.org/10.1016/B978-0-12-802259-7.00015-4

Technological fixes, such as hatcheries and aquaculture (otherwise known as fish farming), have been employed to address overfishing concerns. These approaches help produce specific fish species for the market, but fail to address the underlying social relationships that created the fishery crisis. The history of salmon fisheries in the Pacific Northwest illustrates how a once plentiful wild population was turned into an overexploited commercial stock that eventually became a farmed commodity.

ever-expanding supply of farmed fish. Due to these marketing efforts, salmon became a common offering at most US restaurants. Salmon is third in regard to all seafood options offered, just behind tuna and shrimp. Salmon reaches a penetration of 53.8% in casual restaurants and 82.7% at fine-dining restaurants (Cobe, 2012). The high percentage of restaurants serving salmon has expanded profits for salmon producers. Salmon aquaculture has created a steady supply of fish and

The FDA application continued to move through the regulatory process unhindered. By 2010, the FDA's Veterinary Medicine Advisory Committee concluded that the genetically engineered fish was safe to eat and posed no threat to the environment. In 2012, the FDA released its draft Environmental Assessment with a preliminary "finding of no significant impact." Critics suggested that this finding was premature and did not allow for the full range of ecological and social

The commodification of salmon, and the eventual genetic modification of this fish, is the result of specific political–economic relationships, focused on growing sales and maximizing profits. The depletion of wild salmon stocks posed a challenge for producers and distributors. New technological approaches, such as hatcheries and later aquaculture systems, were employed to maintain production. Intensive methods of fish farming increased the control of production and reduced the vagaries of ecological variation and change. Salmon aquaculture followed the lead of industrial agriculture, which produced large-scale, single-crop, input-intensive commodities for the global market. With this infrastructure in place, salmon could be produced on a large scale for the global seafood market. Established markets in wealthy countries ensure outlets for this valuable commodity. Salmon have now become a valuable food commodity in global markets, particularly in the Global North. In order to further enhance the efficiency of production, the industry is pursuing the development of genetically modified salmon to allow the animal to grow twice as fast.

The introduction of this technology using a fish rather than a terrestrial animal, such as a cow, invites an exploration of how the public perception of genetic modification varies by species. For example, genetic modification of plants is seen in a different light than when it involves animals, in part due to cultural considerations of how we view different life forms. Although a bit speculative, fish are likely a more "palatable" way to introduce this technology in animals produced for human consumption rather than if it was being proposed on land mammals. The fact that fish are not considered charismatic megafauna may have helped advance salmon as the leading edge in the application of genetic technologies to the realm of animal-based production.

Cobe, P., March 31, 2012. Oceans of confusion. Restaurant Business 111 (4), M1–M6.

Cox, S.K., 2004. Diminishing Returns—An Investigation into the Five Multinational Corporations that Control British Columbia's Salmon Farming Industry. Produced for the Coastal Alliance for Aquaculture Reform, last updated 2004. http://web.idv.nkmu.edu.tw/~tomhsiao/S%20T%20Management/DiminishingReturns_final.pdf (accessed 07.03.14.).

FishstatJ—Software for Fishery Statistical Time Series, 2014. FAO Fishery and Aquaculture Global Statistics. FAO, Rome.

Food Safety News, March 4, 2014. Kroger, Safeway Will Nix GMO Salmon Regardless of FDA Decision. http://www.foodsafetynews.com/2014/03/kroger-safeway-turn-down-gmo-salmon-regardless-of-fda/#.VLWMMRYdVUT (accessed 13.01.15.).

Foster, J.B., Clark, B., York, R., 2010. Capitalism and the curse of efficiency: the return of the Jevons paradox. Mon. Rev. 62, 1–12.