

Survival and Growth of Eight Fish Species in Various Standards of Reclaimed Water from Cattle Feedlots

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The culturing of fish has been an endeavor of man for centuries, and has become a necessity in today's growing global society. Today, there is also a growing focus on the intensive culturing of fish and other aquatic organisms as a sustainable source of food and revenue. At the same time there is a growing view that on a global scale we must reuse and conserve our natural resources as much as possible, and minimize pollution. Together these factors have brought about an interest in integrated systems, and particularly those that reuse water, which can also produce a marketable product in the process. With this in mind our goal is to incorporate aquaculture with the waste treatment process (natural) of waste from confined animal feeding operation (CAFOs). A natural treatment system is one that degrades or treats waste by processes that occur naturally.

This process entails the following steps: (1) the anaerobic digestion of the CAFOs waste (under water); (2) filtering the digested effluent through a constructed wetland; and (3) growing fish in the filtered effluent before it is discharged. This system will not only purify water to acceptable standards for discharge, but also produce valuable commodities such as methane gas (can be burned to create electricity), aquatic plants, and fish.

The goal of this proposed research is to develop the best strategies for integrating aquaculture as an integral part of wastewater management. To achieve this goal eight species including koi, platys, mollies, redbfin shiners, fathead minnows, tilapia, channel catfish, and bluegill will be evaluated for survival and growth in varying levels of reclaimed water from CAFOs. The fish will be evaluated in effluents containing organic waste with a chemical oxygen demand (COD) of 0, 20, 100, 300, and 500 mg/l. Water quality parameters will also be monitored daily and weekly in effluents from constructed wetlands which receive waste from CAFOs. With this information individual tolerance limits will then be established for each of the species evaluated. The tolerance limits will then provide the information needed by managers to efficiently cultivate these species within an integrated wastewater system.

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