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GROWING BLOTCH FREE WATERMELON TRANSPLANTS UTILIZING RECIRCULATING AQUACELLS, AQUAPONICS, TILAPIA AND VERMICULTURE WASTE REDUCTION SYSTEM

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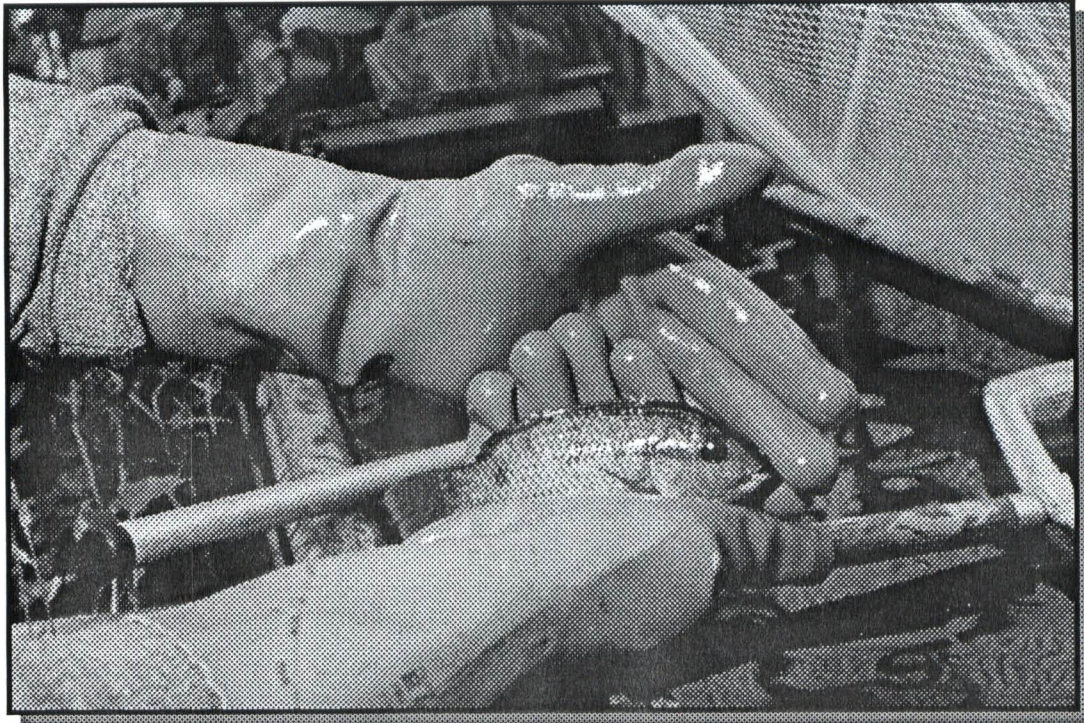
Background. The Texas Agricultural Extension Service's primary initiatives include sustainable cultural practices for water quality and water conservation. Controlling greenhouse agricultural runoff using constructed wetlands (CW's) inside a closed greenhouse recirculating aquaculture/aquaponics system growing 'Mozambique' tilapia fish has helped maintain water quality and water use efficiency since start-up date of October 12, 1995.

Research Findings. Fish and plant waste recycling using best management practices (BMP's) such as settling tanks, raceways, constructed wetlands, vermiculture bins (brown nose earthworms), algae, submerged aquatic plant, and aquatic snails have efficiently controlled levels of N, P, K, Mg, Fe, pH, BOD and odors within the system. Efficient energy use was maintained by mechanical oxygenation of brood fish raceways; gravity flow of water; and free waterfall outlets in and out of troughs, tanks and CW's to increase oxygenation of water. Greenhouse practices used in this start-up research were adjusted to be in compliance with state and federal rules and regulations for water quality. Tilapia fish, aquatic plant sales (aquarium outlet), 'blotch' free watermelon transplants, herbs and other vegetable transplants sales to farmers could provide sustainable profits. Organic certification of greenhouse crops including iris could provide special markets.

Soil, water and plant tests were obtained from the Texas A&M Soil and Water Testing Laboratory. On-site tests were completed for pH, ammonia, water temperature, clarity, nutrients, salt (salt refractometer) and casting quality. Fish culture, plant production and pest management were implemented along the selection of best biological animal and plant pest control to maintain water quality. 'BioGuard', 'Naturalis ES', 'Queen Siam' basil, sulfur, boric acid, electric soil pasteurizer, Asian lady beetles, food dehydrator (used to fumigate the greenhouse with basil oils), lime, yellow stick insect trap boards, companion plantings, and ground frogs were used for the integrated pest management of insects and diseases.

Applications. Closed water recirculating aquaculture/aquaponics systems can be designed and installed at the farm in transplant greenhouses to allow farm families sustainable economic competitiveness, agriculture communities acceptance, and a sustainable vegetable transplant production environment to help control foliage diseases. Two schools in the East Texas area are

using the tilapia fish, gutters, compost and gravity water flow model for recirculating waste water in bio-centers. The trough watering method was applied to reduce 'blotch' disease which can be spread from one infected seedling to many watermelon transplants where overhead water methods are used. The aquacell water reuse system was used to grow transplants free of disease for six acres of demonstration plots and Extension county demonstration trials during the spring of 1996 and 1997.



Growing *Mozambique* tilapia fish in a recirculating aquacell system has provided sustainable cultural practices for water quality and water conservation at the Texas A&M University Agricultural Research and Extension Center at Overton.

(Robert Burns Photo)



Marty Baker, Extension Horticultural Specialist, originally established the aquaculture/aquaponics system to grow "blotch" free watermelon transplants, herbs, aquarium plants, iris and other vegetable transplants.

(Robert Burns photo)