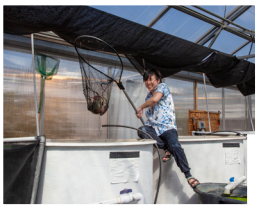
Aquaponics: Small Footprint, BIG IMPACT.

Aquaponics is a symbiotic system of raising fish and vegetables with minimal land, water and fertilizers. Scientists at UArizona are innovating to improve the health, productivity and profit-margins of aquaponic agriculture.

WHY AQUAPONICS?

- Reduces water consumption by up to 90%.
- Eliminates use of harmful chemicals.
- Enables food production near mouths, such as in urban areas, to reduce transportation costs.
- Gives access to seafood and fresh, organic produce year-round.
- Makes food production possible in arid climates inhospitable to conventional agriculture.



Fish are weighed to measure their growth as related to their type of feed.

Tilapia are raised in 6 rearing tanks, 40 fish per tank. Tanks are given different feed mixes to see how they affect fish growth and vegetable nutrient content.

Filtered water from rearing tanks is run to floating rafts containing vegetables. Plant growth in each bed is monitored in relation to the type of fish feed used in the tank enriching each bed's water.

Waste water is filtered through solid waste settling and biofilters. Ph.D. student Andrew Masciola (left) is studying the potential benefits of adding endangered mussels to the biofilter.

Fingerlings are started in nursery tank.

CURRENT UARIZONA AQUAPONICS RESEARCH QUESTIONS

- Is there a viable, more sustainable protein alternative to fish meal for aquaponic systems?
- Which fish feed results in the most nutritious, highest quality fish and vegetables?
- Can adding endangered mussels to aquaponics biofilters improve filtration or add conservation value to the process?

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Raising insects to add to new fish food blend

Farmed mushroom byproduct to add to fish food blend

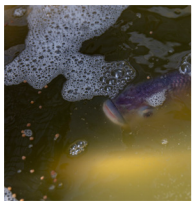
Combining ingredients in varying proportions

Grinding conventional fish feed (control diet)

MUST WE FEED FISH TO FISH?

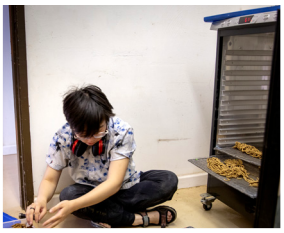
Conventional fish meal is expensive and resource-intensive to produce. Students are testing alternative feeds with insects such as the black soldier fly to reduce the cost and ecological impact of fish food.

Shaping fish blend into pasta-like strands



Feeding experimental pellets to fish

Breaking up strands into pellets



Drying new fish food strands in food dryer

UARIZONA AQUAPONICS SCIENTISTS & FUNDING

- A $1M USDA training grant enables **Kevin Fitzsimmons**, Ph.D., professor of environmental science and director of International Initiatives, College of Agriculture, Life & Environmental Sciences, to fund students to conduct studies in aquaponics.
- Ph.D. student Andrew Masciola's study of the potential role of endangered mussels in recirculating aquaponics systems is funded by Kasser Joint Institute for Food, Water, and Energy Security.
- Research assistants Joy Liu, Ellie Laton, and Lillian Mance work with support from Fitzsimmon's USDA training grant.

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