



Water Quality and Food Safety in Aquaponic Fish and Vegetable Production Systems

Aquaponics in the Classroom, 2012

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What is Food Safety?

- Preventing foodborne illness
- Recognizing responsibility
 - Food safety is about people
- Chemical, physical, microbiological
- Focus: microbiological

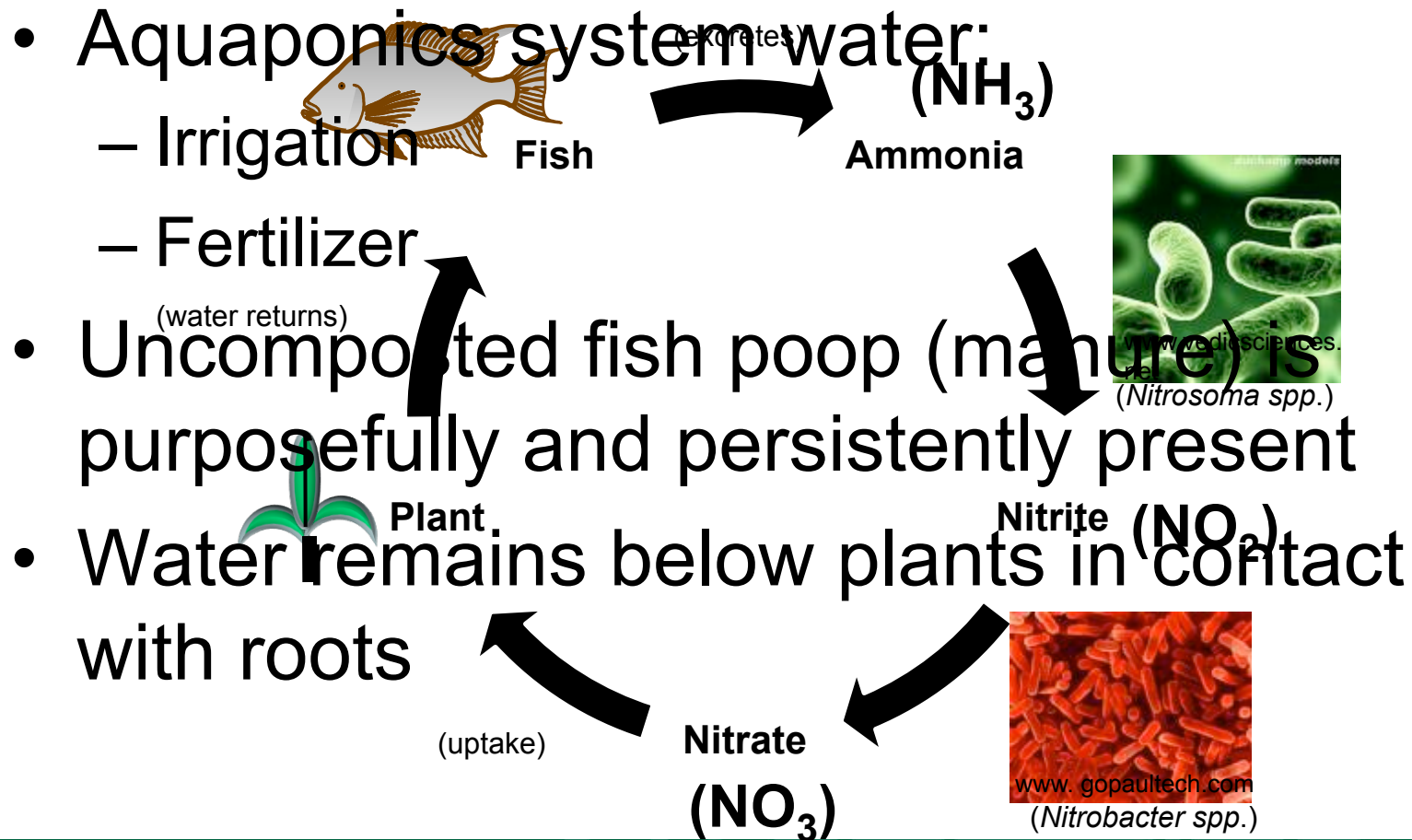


Foodborne Illness

- Human and economic costs
 - U.S.: ~\$77B annually
 - Many factors involved
- Indicator microbes in irrigation water
 - Fecal contamination?
- *E. coli*: warm-blooded origin
 - Fish are cold-blooded



Symbiotic Relationships in an Aquaponic System



Challenges and Opportunities

- Food safety certification
 - Large vendors
- Third party certifiers
 - Audits based on industry and science
 - “Auto-failure”
- Currently: USDA is unwilling to support food safety for aquaponics
 - Lack of scientific information



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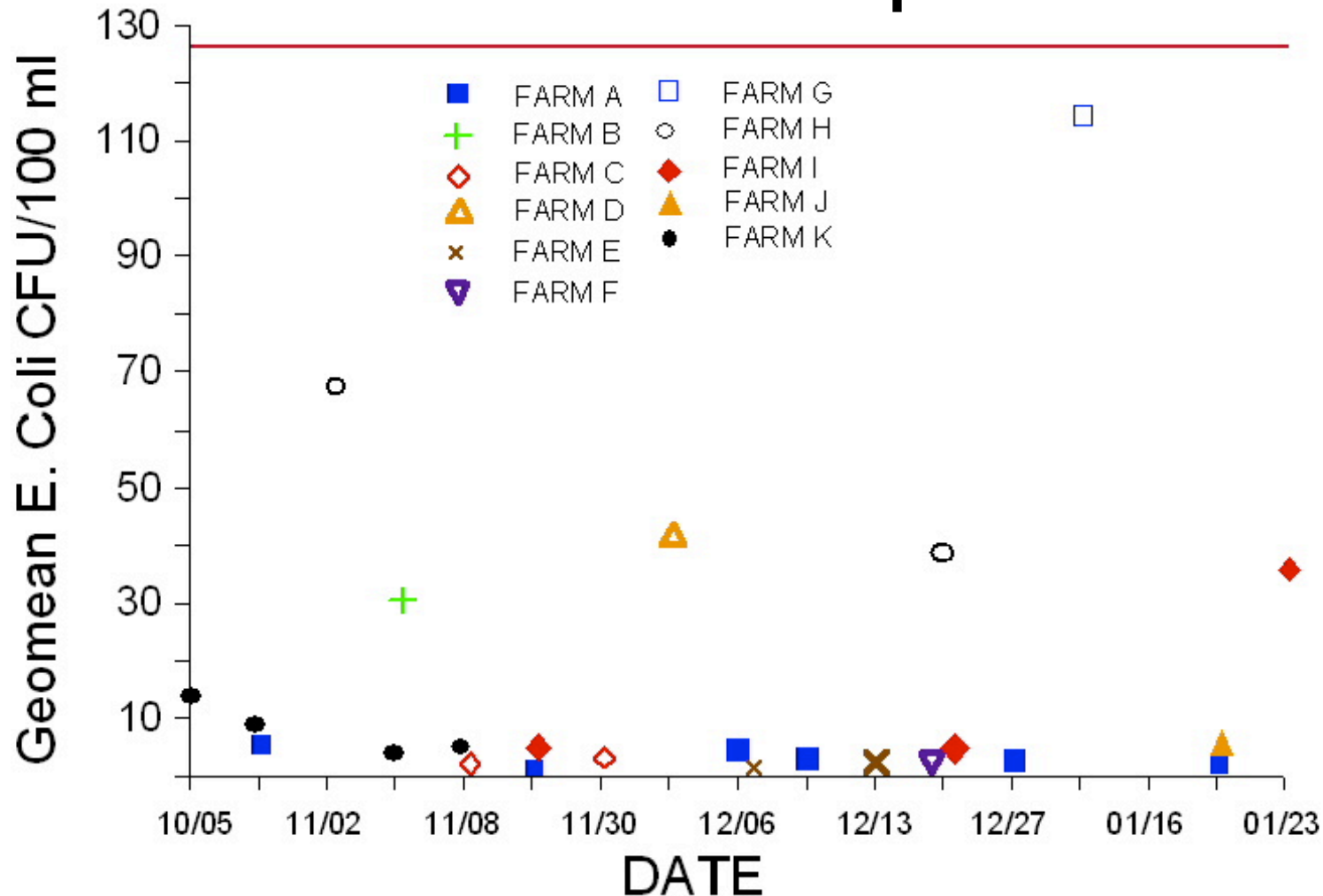


Current Study

- CTAHR: Farm Food Safety/Aquaponics Extension Programs
 - Funding: HDOA
- Duration: Jan. 2011-Jan. 2012
- Methods
 - Samples collected, chain of custody
 - Samples submitted to accredited laboratory
 - Data analyzed



Results: Aquaponic System Water From Multiple Farms



Results: Produce

- Tested: lettuce, beets, cucumbers, tomatoes, watercress, green onions, pak choi, and blueberries
- Pathogens: *E. coli* 0157-H7 and *Salmonella spp.*
- Negative



Results: Inputs

- Tested: Fish food (Silver Cup Trout Chow), bone meal, kelp meal, and Sustane®
- Pathogens: *E. coli* 0157-H7 and *Salmonella spp.*
- Negative



Results: Fish Muscle

- Tested: Aquaculture/ aquaponic system water and raw fillet of culture fish
- Pathogens: Generic *E. coli* (water), *E. coli* 0157-H7 and *Salmonella spp.* (water and muscle)
- Water: Positive (generic), Negative (pathogenic)
- Muscle: Negative



Image retrieved from: <http://www.menumagazine.co.uk/archive/oct2011/fish.html>



Summary

- Preliminary results
- GAP: use potable water
- Need science-based variance for “auto-failure” in aquaponic water



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