Food Fish Culture
Florida Aquaculture Food Fish

Produced by the Division of Aquaculture - 2017

Photo credit: Brain Skerry, National Geographic
Introduction

• This presentation will cover.....
  • Where food fish come from
  • Global food fish industry
  • U.S. food fish industry
  • Florida’s food fish industry
  • Common production methods
    • Catfish pond culture
    • Marine shrimp breeding
Where do food fish come from?

• If you said grocery store, you are not alone.
• Many people forget that their food has a history before arriving in a neat frozen package at your local store.
Where do food fish come from?

Wild capture from:
- Oceans
- Lakes
- Rivers

Aquaculture Farms
- Ponds
- Tanks
- Pens

No matter where you are in the world, the fish you consume are either captured from the wild or produced at an aquaculture farm.
Brief History of Food Fish

• Fishing has always been a critical food source for humans worldwide.

• Even today, some 1 billion people worldwide depend on fish as their primary source of protein (meat) (FAO 2000).

• However, as the world’s population increases the oceans alone cannot sustain the demand for food fish....
Wild fisheries: Yield maximized

- Fish are the last wild food
- Global consumption of fish greater than what the oceans can provide
- Maximum Sustainable Yield = 90 million tons per year
- Aquaculture is rapidly growing to meet this supply shortage
- Aquaculture is the most efficient form of animal agriculture

Figure from: FAO 2016

90% of wild fisheries are at maximum harvest or greater

Figure 13: Global trends in the state of world marine fish stocks since 1974
Problem: capture fisheries at maximum harvest rate

Wild harvest has not increased for 30 years. Aquaculture has met the increased demand for fish products.

In 1950, 97% of fish were caught from the ocean. Today, only 50% of fish are caught from the ocean.

PRODUCTION DATA INCLUDE SEAWEED.

Figure from: FAO 2016
Aquaculture will soon be the norm

To put fish farming growth in context, as of 2013 more fish is farmed globally than beef each year!
Where do our food fish come from?

Nearly 80% of seafood is imported into the U.S., resulting in a $14 billion dollar trade deficit, second only to the U.S. oil deficit.
Top Food Fish Produced Globally

- 6 of the top 10 are carp!
- While most of these species aren’t popular in the U.S., they are a staple food source for SE Asia, China and India.
- That’s a lot of zeros.....
  - 49.3 BILLION pounds of the six major carp species are produced annually!
China produces 62% of the world’s food fish, more than all other nations combined.

- 60.1% of inland food fish
- 94% of inland crustaceans
  - Primarily shrimp
  - USA is #3!
- 83% of mollusks
U.S. Food Fish Industry

- Food fish are the primary product cultured in the U.S.
- 71% of industry in 1998
- 53% of industry in 2013
- Although, market share has declined by 18% in 15 years, production has increased 6%.
Florida represents ~5% of the U.S. food fish industry

Mississippi is still the #1 food fish producer in the U.S., although sales have declined by 30% since 1998.

Why have sales declined? International import competition
What’s the #1 food fish produced in the U.S.?
What’s the #1 food fish produced in the U.S.?

Channel catfish
Where are catfish produced in the U.S.?

Maps of Four Major Southern States Showing Counties with Catfish Farm Ponds

- Mississippi Delta
- Black Prairie
Catfish represent ~75% of the industry.
How are these species produced?

- **Catfish**
- **Crawfish**
- **Trout**
- **Salmon**
- **Tilapia**

**Production Methods:**
- **Ponds**
- **Tanks**
- **Raceways**
- **Sea Pens**
Food Fish Aquaculture in Florida

Food fish species produced in Florida

- Tilapia
- Catfish
- Pompano
- Cobia
- Hybrid Striped Bass
- Sturgeon
Florida’s Food Fish Industry

- 49 farms in Florida (2005)
- 2013 sales in Florida = $19.9 million (including shrimp)
  - $3.6 million excluding shrimp

Top Food Fish Sales by Species in Florida (2013)

- Shrimp 74%
- Tilapia 14%
- Catfish 7%
- Hybrid Striped Bass 5%

- While shrimp are technically not fish, they’re included because they are the major aquaculture food product in Florida!
- Florida is 2nd in the nation in shrimp production sales!
- And the shrimp industry is rapidly growing in the state, with 7 farms in 2005 and 20 in 2013!
Culture Methods in Florida

• Food fish are primarily produced in either ponds or recirculating tanks throughout the state
  • Pond species
    • Catfish
    • Tilapia
    • Shrimp
  • Recirculating tank species
    • Hybrid striped bass
    • Tilapia
    • Shrimp
    • Sturgeon

Why are two different methods used for tilapia and shrimp?
• Production method is determined by size of farm, capital investment and annual production goals.
• Most food fish can be aquacultured in a variety of different ways depending on the environment and farmer’s goals.
Pond Culture Methods

*We will focus on catfish culture for this section...*

- Ponds vary in size (generally 10 acres each) depending on the ponds purpose.
  - Broodstock (spawning adults) and larvae ponds are smaller.
  - Grow-out ponds are larger.
- Fish are fed by an air power spreader that shoots feed across the pond surface.
Catfish Culture Methods
Catfish spawning and larval rearing techniques

1. Spawning containers are placed into broodstock ponds
2. Female lays egg mass in container
3. Farmer collects the egg mass
4. Eggs are hatched in trough tanks with paddles that mimics male parental care.
Did you know?
Catfish lay adhesive egg masses that stick together in a large clump.

In nature, the eggs stick to woody debris in the cavity where spawning occurs. After females lay the egg mass, males guard the nest and keep the eggs clean by slowly fanning his tail across them.
Catfish Culture Methods

Catfish fry or larvae are raised indoors until they absorb their yolk-sac. They are then stocked into grow-out ponds.

Catfish fry ready for pond stocking.

Photo credit: Mississippi State University Extension Service
Catfish Culture Methods

After about 15 - 18 months of growth, catfish are ready to be harvested. The seine net is reduced in size until catfish can be scooped up in a large basket on a crane.

Harvest starts by running a seine net across the pond, crowding the catfish into a confined area.

The basket is then dumped into tanks on a hauling truck, and fish are transported to a processing plant.
Marine shrimp aquaculture is rapidly growing in the U.S. and Florida.

While growing out shrimp from larvae to harvestable adults is relatively simple, spawning marine shrimp is not.

A large breeding facility in southwest Florida provides post-larvae shrimp to farms all over the world.
Conclusions

- Aquaculture is a sustainable alternative to wild harvest fisheries.

- As the global population grows and demand for fish increases, aquaculture is rapidly expanding to meet this protein demand.

- Shrimp, tilapia and catfish are the main food fish products in Florida.

- Florida produces a wide variety of food fish and is a hotspot for research, innovation and highly technical production methods (marine shrimp breeding).
Conclusion

For questions about this presentation or aquaculture in Florida please contact the Division at:

Tallahassee Office: (850) 617-7600
Bartow Office: (863) 578-1870
Email: aquaculture_web@FreshFromFlorida.com
Website: FreshFromFlorida.com
Tour: Evans Fish Farm
Host: Brandon McLane
Website: http://www.evansfishfarm.com/