



# SOY AQUACULTURE ALLIANCE (SAA) - UPDATES

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# OVERVIEW

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1. The soybean association world
2. Soybean checkoff investments in aquaculture
3. What is the Soy Aquaculture Alliance
4. Key goals
5. Case study



# The soybean association world



# WHO WE ARE

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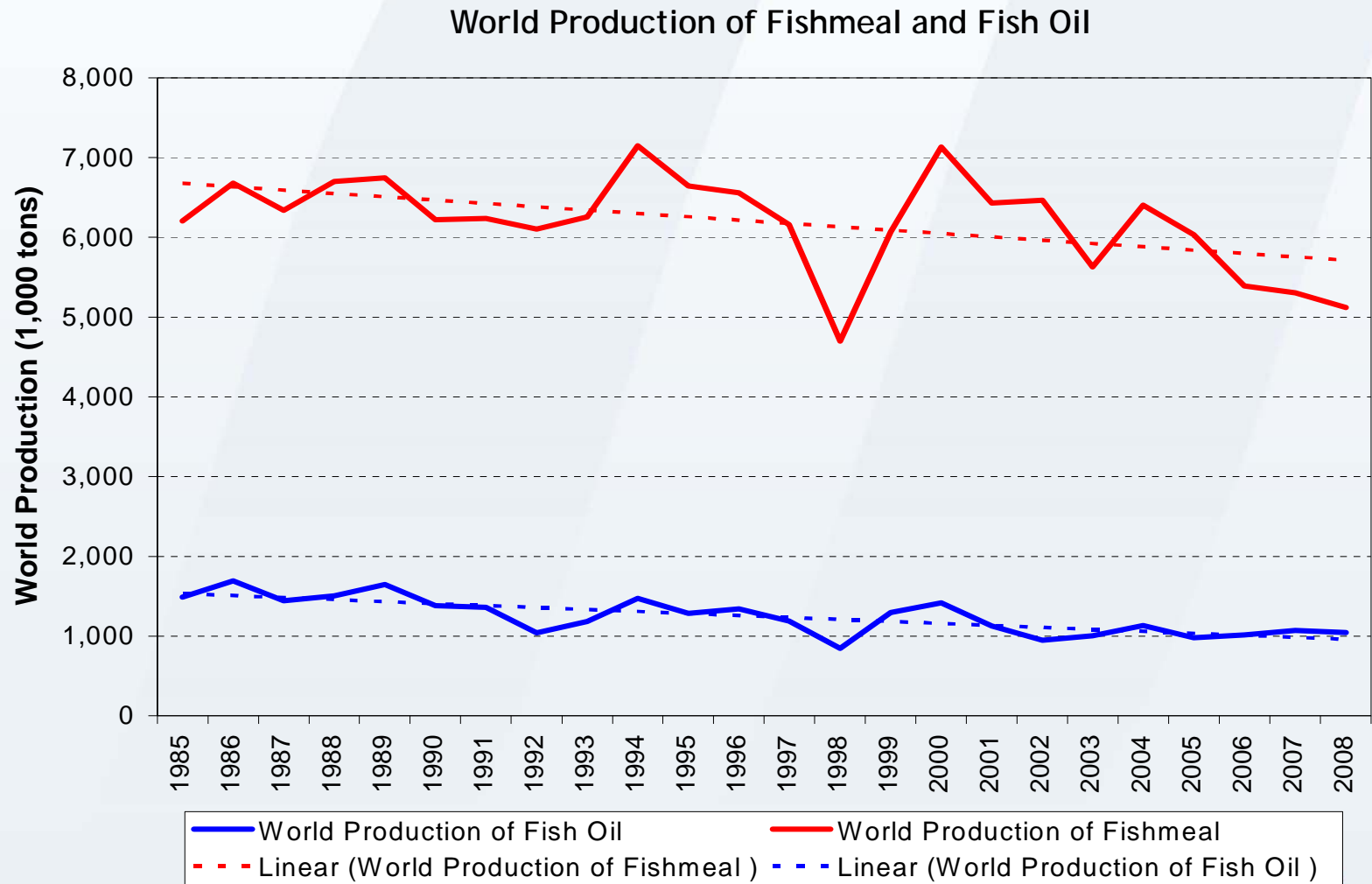
- The soybean checkoff
  - United Soybean Board (USB)
  - Qualified State Soybean Boards (QSSBs)
    - Ohio Soybean Council is a QSSB
- The American Soybean Association (ASA)
- U.S. Soybean Export Council (USSEC)



# Soybean checkoff investments in aquaculture



# FISHMEAL SITUATION



## FINDING AN ALTERNATIVE TO FISHMEAL

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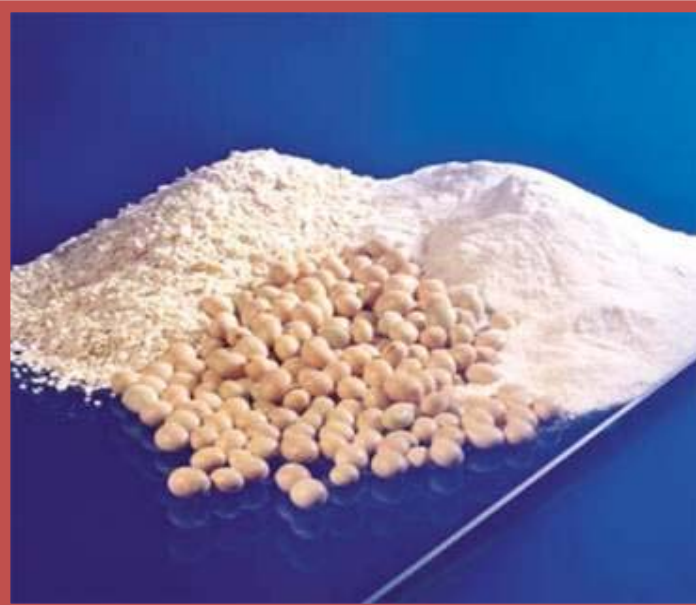
- Between 70-80% of global supplies of fishmeal and fish oil are currently being used in aquafeeds
- With little chance of increased availability, alternatives to fishmeal and oil are required
- The nutritional qualities of soybean meal and soy protein concentrate make them effective ingredients for aquafeeds





# SOYBEAN USAGE IN AQUAFEEDS

- Soybeans are the #1 source of protein meal used in aquafeeds today
- Current estimates show 10 mmt of soy are being used by the global aquaculture feed industry (USSEC 2012).





# SOYBEAN CHECKOFF FOCUSES EFFORTS

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- The Soy-in-Aquaculture project was started in 2002 to overcome certain limitations and advance the use of soybean products in aquafeeds
  - Initial work focused on the impact of antinutritional factors on salmonids
    - Studies were multi-institutional conducted by Purdue University, Michigan State University, University of Wisconsin, Ohio State University, University of Idaho, University of Maine, Kentucky State University
  - Moved into marine shrimp
    - Work conducted by Auburn, Texas A&M Corpus Christi, Purdue University, Oceanic Institute and commercial producers in Mexico, Ecuador, Columbia, China, Southeast Asia, etc...
  - Changed focus to marine fish
    - University of New Hampshire, Virginia Tech and Virginia Cobia Farms, Hubbs SeaWorld, University of Nebraska and commercial growers in Turkey, Egypt, Greece, Southeast Asia, etc...



# SOYBEAN CHECKOFF FOCUSES EFFORTS

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- Start with basic nutritional research at universities: amino acid requirements, fatty acid requirements, digestibility, etc...
- Evaluate soy-based feeds to maximize inclusion in the diet without compromising production
- Field staff works directly with feed mills and farmers to demonstrate feeds and teach them how to optimize efficiencies and profit



# INVESTING IN AQUACULTURE

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- Estimated soybean checkoff investments in domestic aquaculture and domestic research institutions over the last five years  
~\$14 million USD
- Additional funds for international marketing



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# What is the Soy Aquaculture Alliance



**Soy Aquaculture Alliance**



# WHY ANOTHER SOYBEAN ORGANIZATION?

- Sourcing seafood in the U.S.
  1. If we don't grow it, we might not get to eat it
  2. Domestic soybean market development



# CHINA IS CHANGING THE SEAFOOD MARKET

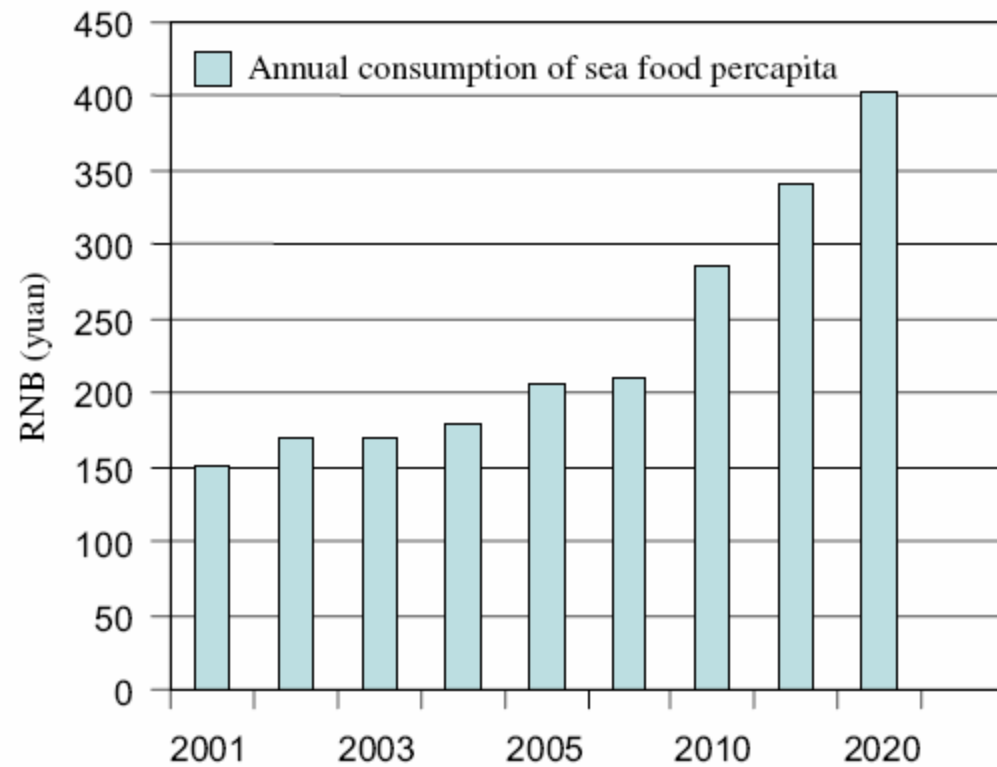
- The United States is the 2<sup>nd</sup> largest consumer of seafood in the world behind China
  - We import ~90% of our seafood
- Changes in the global economy have created major seafood supply issues
  - According to Chinese government, China became a net importer of seafood in 2010



# CHINA IS CHANGING THE SEAFOOD MARKET

Taken from George Chamberlain's GAA presentation

- Domestic demand for seafood in China has increased from 7 kg consumption per person in 1985 to about 25kg in 2005
- The same source estimates that China will double its per capita spending on seafood products between 2008 and 2020 (in Yuan terms)





# CHINA IS CHANGING THE SEAFOOD MARKET

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- Major producing countries are now targeting China as their primary market, not the U.S.
  - 7.2% decline in shrimp imports in 2012, biggest decline since 1995
  - 8% decline in tilapia imports in January 2013 compared year-to-date with January 2012
- Most of the top products we eat in the U.S. are imported



# AQUACULTURE CONTRIBUTES

- Per Capita consumption (*pounds*) - from John Connelly (NFI)

	<u>2010</u>		<u>2011</u>
Shrimp	4.000	Shrimp	4.200
Canned Tuna	2.700	Canned Tuna	2.600
Salmon	1.999	Salmon	1.952
Tilapia	1.450	Alaska Pollock	1.312
Alaska Pollock	1.192	Tilapia	1.287
Catfish	0.800	Pangasius	0.628
Crab	0.573	Catfish	0.559
Cod	0.463	Crab	0.518
Pangasius	0.405	Cod	0.501
Clams	0.341	Clams	0.331



# WHY ANOTHER SOYBEAN ORGANIZATION?

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- Sourcing seafood in the U.S.
  1. If we don't grow it, we might not get to eat it
  2. Domestic soybean market development
  
- Why USB and QSSBs are involved:
  1. Funding many projects, but not coordinating
  2. Potential domestic market for U.S. soybeans
  3. Potential to supply seed stock to a global industry



# THE SOY AQUACULTURE ALLIANCE IS

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- Membership organization designed to bring industry and soy groups together in common cause
  - Members include:
    - State soybean checkoff organizations: IA, IL, MI, IN, OH, KY, SD, KS, NE, DE, MD
    - Commercial partners: Pentair, Bell Aquaculture, Aquaculture Enterprises



# Key goals



# RESEARCH IS A MAJOR DRIVER

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- Established the Science and Technology Advisory Panel (STAP)
- Key research gaps identified for funding
  1. Taurine requirements of fish
  2. Impacts of soy-based feeds on waste output
  3. Genetic selection to develop domesticated broodstock
- Peer review of proposals



# RESEARCH IS A MAJOR DRIVER

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- Conducting five major research projects
  - Genetics:
    - U of Idaho - Genomic and physiological assessment to identify changes allowing high-soy use in genetically-improved line of rainbow trout: Breaking the 20% soy protein barrier in feeds for marine fish
    - Integrated Aquaculture International - Improving soy utilization in marine shrimp
  - Waste Output:
    - ARS - The impact of soy-based feeds on waste output of rainbow trout
  - Taurine:
    - Auburn - Safety and utility of taurine for marine fish feeds
    - Texas A&M - Effect of extrusion processing on the stability of taurine and subsequent bioavailability to red drum and rainbow trout





# Case study



# YELLOW PERCH NUTRITION

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- Commercial yellow perch diets are not available, so working with Purdue University and Bell Aquaculture to develop a yellow perch feed



# YELLOW PERCH RESEARCH

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- Previous research indicated that hybrid striped bass EAA requirements could be predicted by whole body analysis + 20% EAA, but the addition of trp, thr and ile produced even better growth
- Used what is known from other studies to develop an EAA profile for practical yellow perch diets based on whole body amino acid concentrations



# YELLOW PERCH RESEARCH

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- Used the results from this study to form recommendations for EAA concentrations in a commercial formula
- Until Bell Aquaculture, not enough demand from yellow perch producers for a mill to justify producing a feed
- Worked with a commercial feed mill to produce a test diet



## SAMPLE YELLOW PERCH DIET

Ingredient	%
Fish meal 64/67	5.00
Corn protein concentrate 75%	7.50
Poultry byproduct meal 60%	15.00
Soybean meal 46%	25.00
Whole wheat	25.00
Millrun	10.60
Vitamin premix	1.00
Choline chloride	0.15
Fish oil	2.80
Calcium propionate	0.05
Trace mineral premix	0.30
Stable C	0.10
Poultry fat	2.75
L-lysine HCl	1.00
Feather meal	3.75



# YELLOW PERCH RESEARCH

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- This diet worked, but wasn't ideal
- New soy products and processing techniques will allow us to advance this industry even further
- Conducted a trial with a specialty variety of soybeans



# NEW PRODUCTS PROVIDE FLEXIBILITY

Composition of the experimental diets (g/100 g).

Ingredient	20 FM	15 FM	10 FM	5 FM	0 FM
Fish meal	20	15	10	5	0
SG 3010	36.8	42.3	48.3	53.9	59.4
Corn protein concentrate	5	5	5	5	5
Wheat flour	23	21.5	18.8	17	15.6
Fish oil	6.8	7.2	7.6	8.1	8.5
Lysine HCL	1.1	1.1	1	1	1
Methionine	0.5	0.55	0.58	0.62	0.65
Threonine	0.25	0.24	0.22	0.2	0.18
Taurine	1.5	1.5	1.5	1.5	1.5
Vitamin premix	2.3	2.3	2.3	2.3	2.3
CaHPO <sub>4</sub>	1.8	2.35	2.86	3.42	3.92
Magnesium oxide	0	0	0.05	0.05	0.05
Potassium oxide	0	0	0.56	0.56	0.56
Sodium chloride	0	0	0.28	0.28	0.28
Mineral premix	0.1	0.1	0.1	0.1	0.1
Choline Cl	0.6	0.6	0.6	0.6	0.6
Ascorbic acid	0.3	0.3	0.3	0.3	0.3
Protein	42	42	42	42	42
Fat	9	9	9	9	9





## NEW PRODUCTS PROVIDE FLEXIBILITY

Weight gain, feed conversion ratio and specific growth rates (SGR;  $(\ln \text{ final wt.} - \ln \text{ initial wt.}) / 112 \text{ days} \times 100$ ) for juvenile yellow perch fed the experimental diets.

Diet	Weight Gain (%)	FCR	SGR
20 FM	702	0.81c	1.91
15 FM	745	0.87abc	1.87
10 FM	735	0.89ab	1.86
5 FM	732	0.91ab	1.89
0 FM	694	0.93a	1.85
Commercial	602	0.85bc	1.72
Pooled SE	68.1	0.013	0.087
P > F	0.8061	0.0015	0.798



# QUESTIONS

