



FEED INPUTS FOR AQUACULTURE: soybean industry's perspective

**Steven Hart, Ph.D.
Indiana Soybean Alliance
Indianapolis, Indiana**



Outline of Today's Presentation

- U.S. soybean checkoff industry's involvement in aquaculture
- Indiana Soybean Alliance/Indiana Corn
- Case study – yellow perch feed: research to commercialization

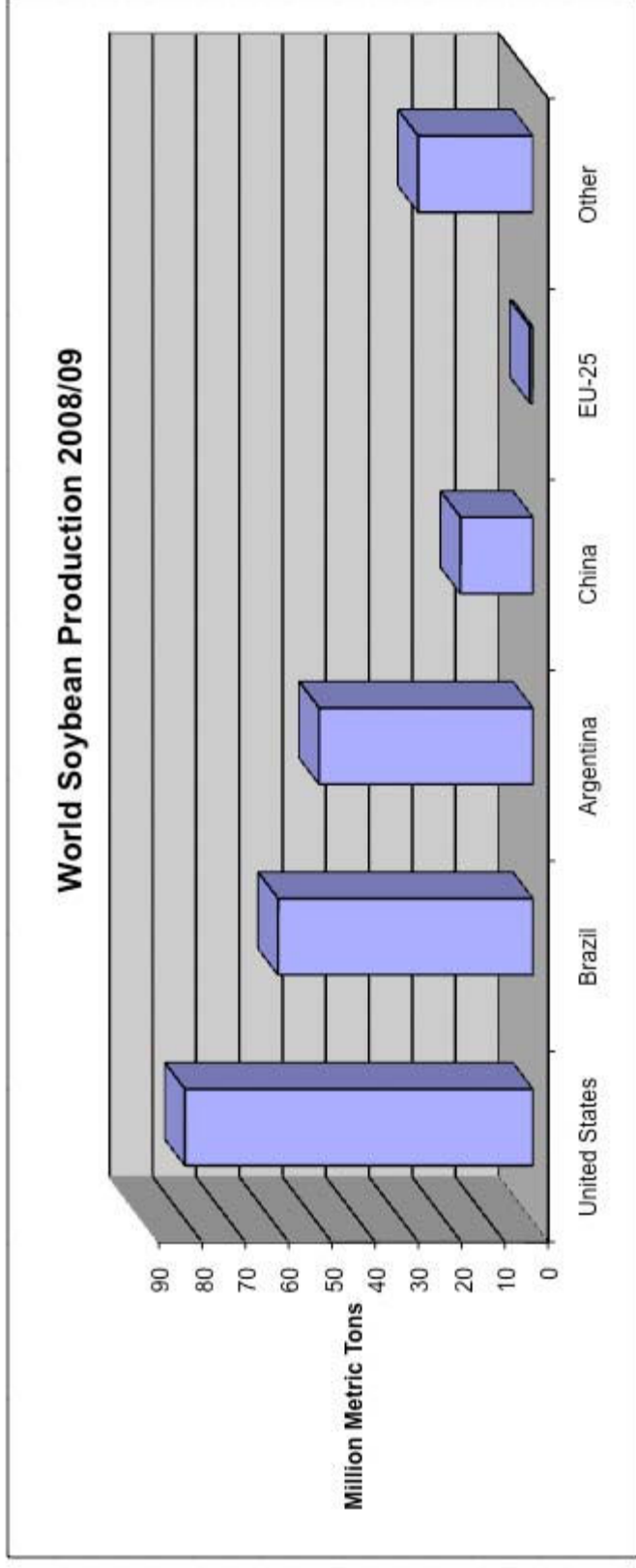


Soybean Organizations involved in aquaculture



U.S. Soybean Organizations Involvement in Aquaculture

- U.S. is the largest producer of soybeans globally



Reference: USDA World Agricultural Supply and Demand Estimates (WASDE) (466), January 12, 2009



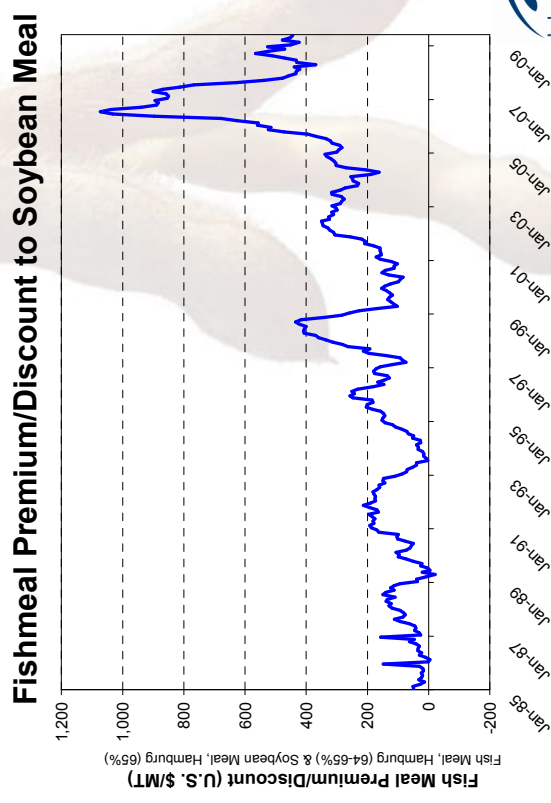
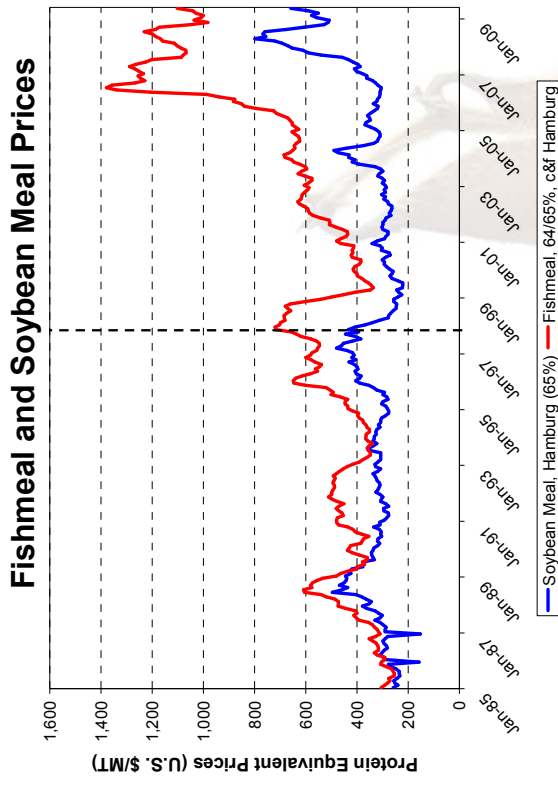
U.S. Soybean Organizations Involvement in Aquaculture

- Soybean yields are projected to continue to increase, leading to increased availability of soybeans and meal
- U.S. soy checkoff organizations realize the growing global aquaculture industry will be a significant user of soybeans as the seafood industry moves from capture to culture technology
- Soybeans are a readily available commodity and are a sustainable feed alternative to traditional fish meal-based feeds, which are limited in supply and getting very expensive



U.S. Soybean Organizations Involvement in Aquaculture

- The fishmeal premium: general upward trend since the early 2000s, peaked in 2006 and 2007
- Since then, the premium has declined to an average of \$450/MT, still above the historical average of \$200/MT
- Fishmeal prices have likely bottomed out, so fishmeal premiums are expected to increase as supplies continue to tighten and demand grows



U.S. Soybean Organizations Involvement in Aquaculture

- 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...
 - Currently focusing on 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...



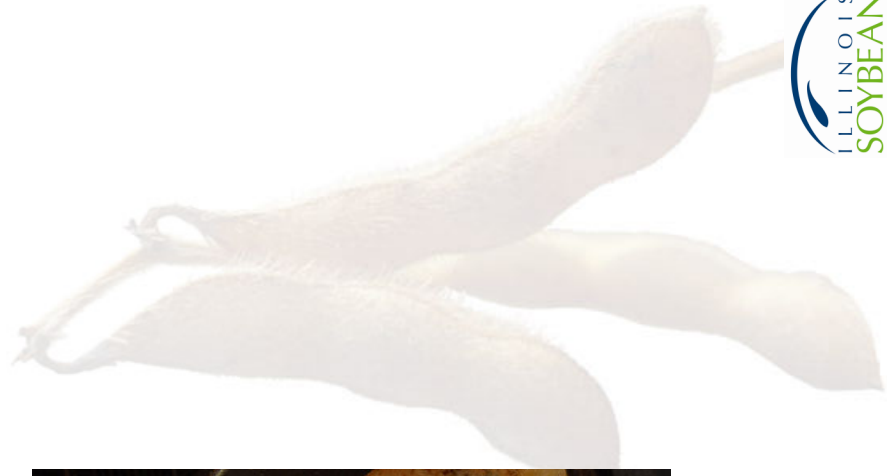
U.S. Soybean Organizations Involvement in Aquaculture

- 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

- **Yields Results: estimates show Chinese aquaculture industry is using 6 mmt of SBM, with a target of increasing by 2-3 mmt in 3 years**



Case Study of Yellow Perch



Yellow Perch History

- Yellow perch put the 'Fish' in the 'Friday Night Fish Fry'
- Unique properties make it an excellent product (small size, mild flavor, firm flesh, etc...)



- Great Lakes commercial harvest over the decades:

Year	1950	1959	1969	1980	1990	1999	2008
lbs	7,141,000	31,628,000	35,362,000	18,268,000	11,751,000	4,908,000	~2,000,000



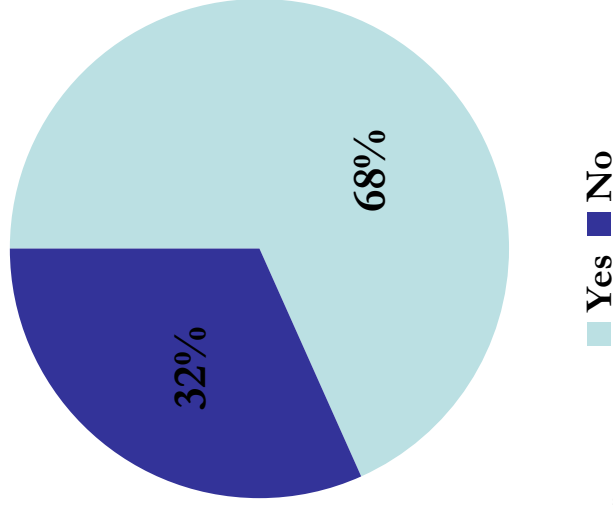
Yellow Perch Markets

- Theoretical demand for yellow perch is ~ 72 million lbs in the Great Lakes region (based on historical consumption data and increases in both population and per capita consumption of seafood)
- Current market supply < 4 million lbs (mostly from Canada)
- Yellow perch retails for \$12-16
- Major interest in yellow perch aquaculture in the Great Lakes region
 - Led ISA into doing market research on yellow perch potential

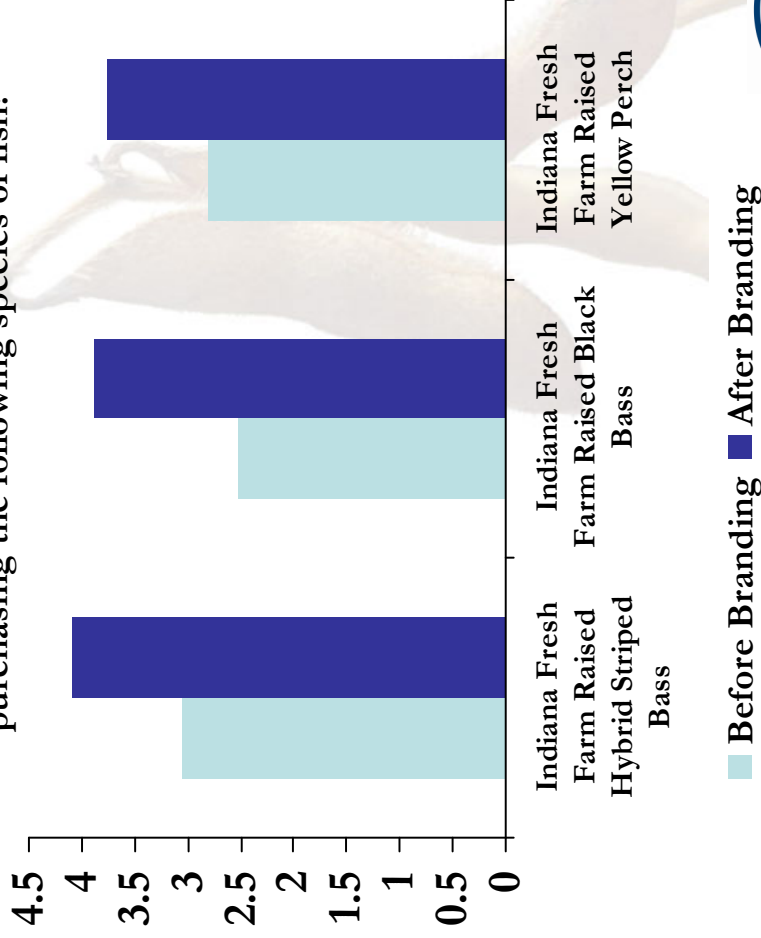


Branding Yellow Perch - Restaurants

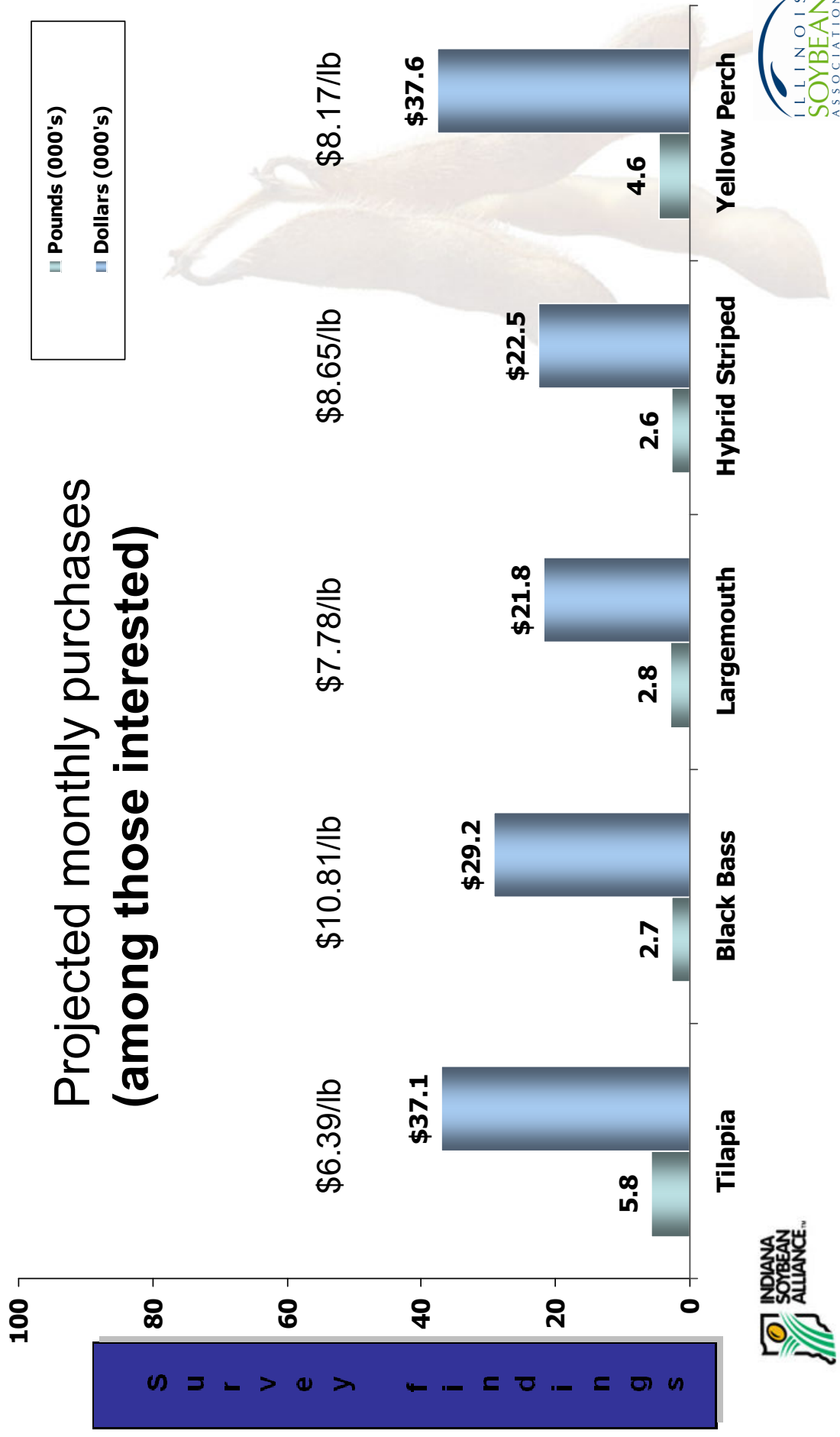
If an "Indiana Fresh Farmed Brand" was developed for these species of fish based on important freshness criteria, do you think your customers' interest would increase?



On a scale of 1 to 5 where 1 being not interested and 5 being very interested, how interested would your customers be in purchasing the following species of fish?



Yellow Perch Sales Potential



Current Yellow Perch Aquaculture

- According to the 2005 aquaculture census, 110,000 lbs of yellow perch were produced (this number is definitely an underestimate)
- Yellow perch aquaculture has made recent national headlines with the opening of Bell Aquaculture in Albany, IN
- Projecting to grow 15 million pounds by 2015



Current Yellow Perch Work

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



Yellow Perch Research

- Began working with yellow perch while a master's student at Michigan State – cohort stocking study
- Conducted yellow perch nutritional work while a PhD student at Purdue
 - Used methionine requirement and whole body amino acid concentration to develop a prediction for essential amino acid requirements



Yellow Perch Research

- Used the results from basic research 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
- Now working with commercial feed mills to produce a diet



Current Yellow Perch Work

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



Current Yellow Perch Work

- Five months into feeding trial and fish on the soy-based feed are out-performing fish fed the commercial standard diet
- Trial will go on until fish reach market size
- Taste test will be conducted to determine if final product meets or exceeds consumer expectations
- Also conducting work with soy protein concentrate to see if amount of soy can be pushed even higher



Questions

- For more information on soybean checkoff organizations and their involvement in aquaculture research, please visit: <http://www.soyaqua.org/>

