



Aquaculture Nutrition: Challenges & Beyond

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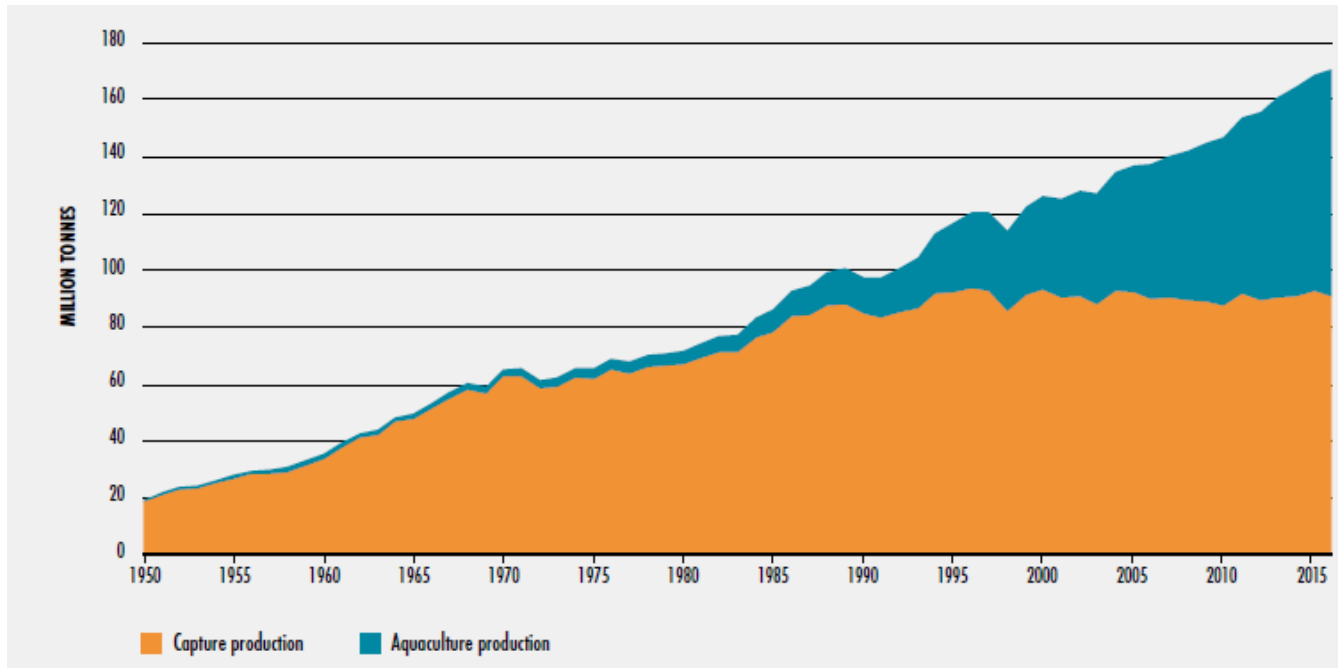
RESEARCH
PROGRAM ON
Fish

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Introduction



FAO, 2018

“Aquaculture is the fastest growing sector in agricultural production globally”

“Aquaculture production represents 47% of the total 171 M tonnes”

→ Momentum should at least be kept, and at best be spurred to satisfy the seafood demand of growing world population.

Introduction (continued)



Aquaculture Nutrition is now a clear, specific field in the aquaculture sector/science: there is even a special journal, *Aquaculture Nutrition*

Dr. Roy Palmer: “every other scientist that I meet is an aquaculture nutritionist”

→ Because feed is still the most expensive input
→ (50-70% in semi-intensive and intensive systems).

Aquaculture Nutrition: Opportunities

- Positive changes in aquaculture nutrition can affect the entire industry



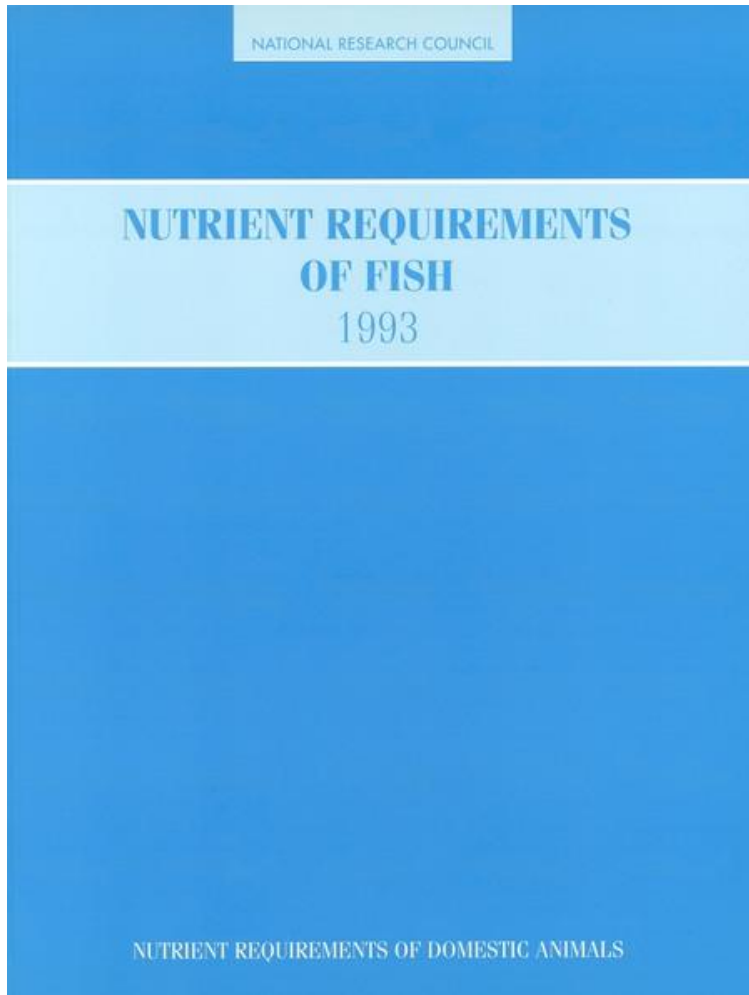
Make fish more affordable to feed the world



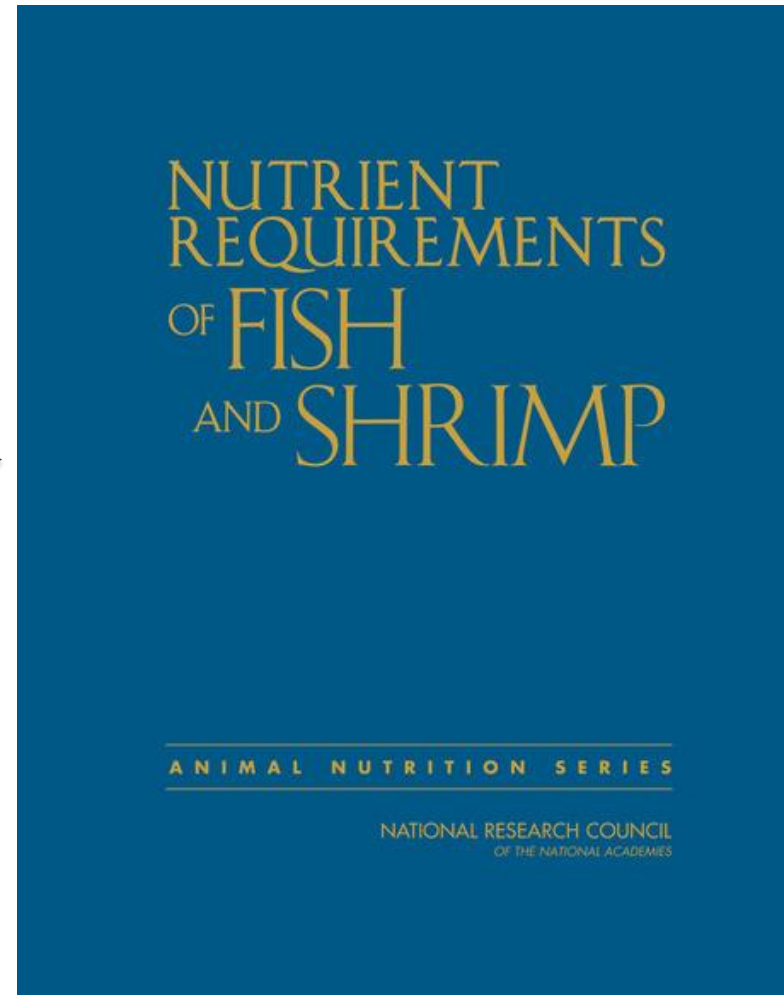
- To indirectly feed people by directly feeding the fish



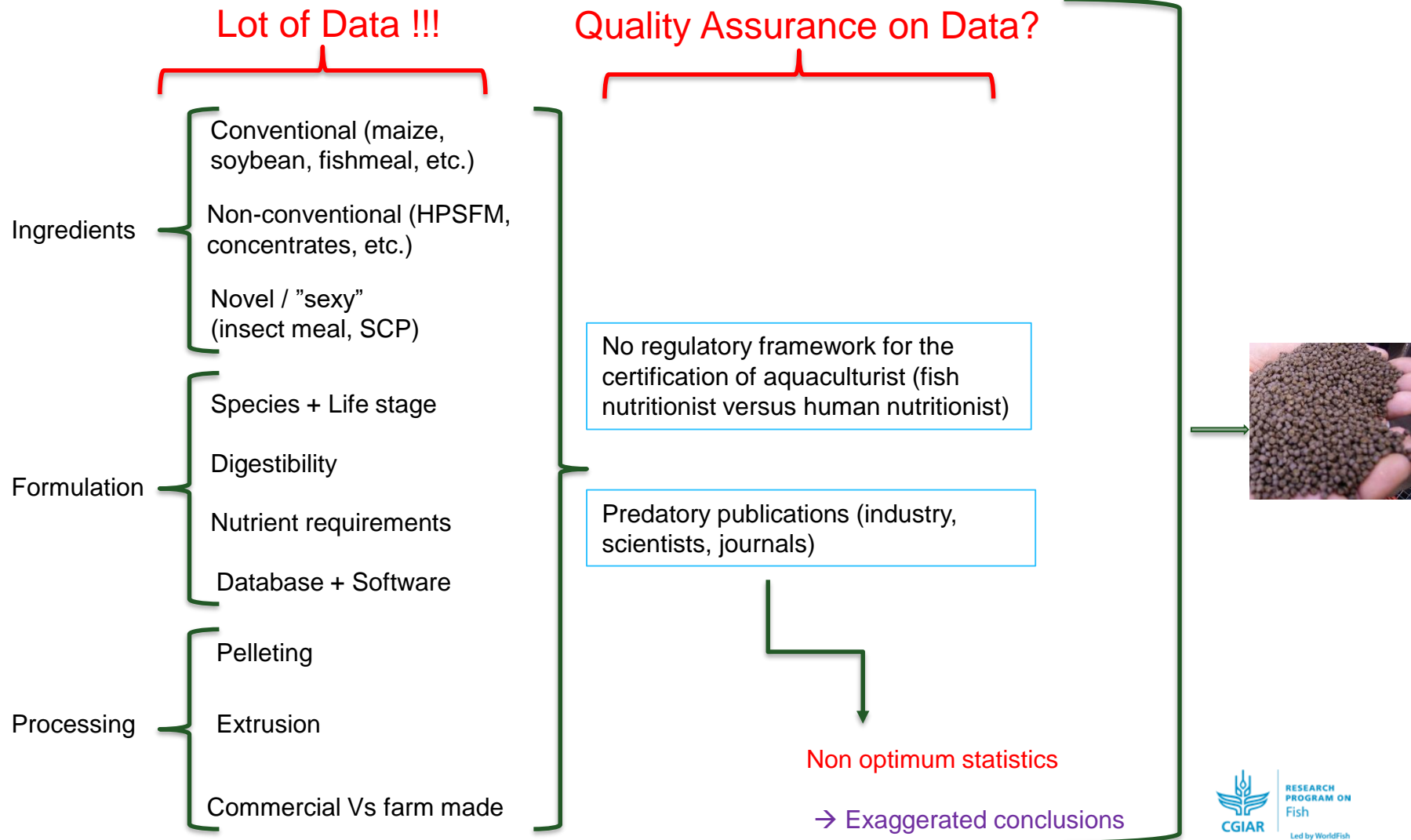
Aquaculture Nutrition: one challenge-Data



18 years



Aquaculture Nutrition: one challenge-Data



Aquaculture Nutrition: one challenge-Data

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journal homepage: www.elsevier.com/locate/aqua-online



Short communication

Misuse of multiple comparison tests and underuse of contrast procedures in aquaculture publications



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Most of the experimental variable in aquaculture nutrition are quantitative

Ex: level of protein (0%, 5%, 10%, 15% and 20%)

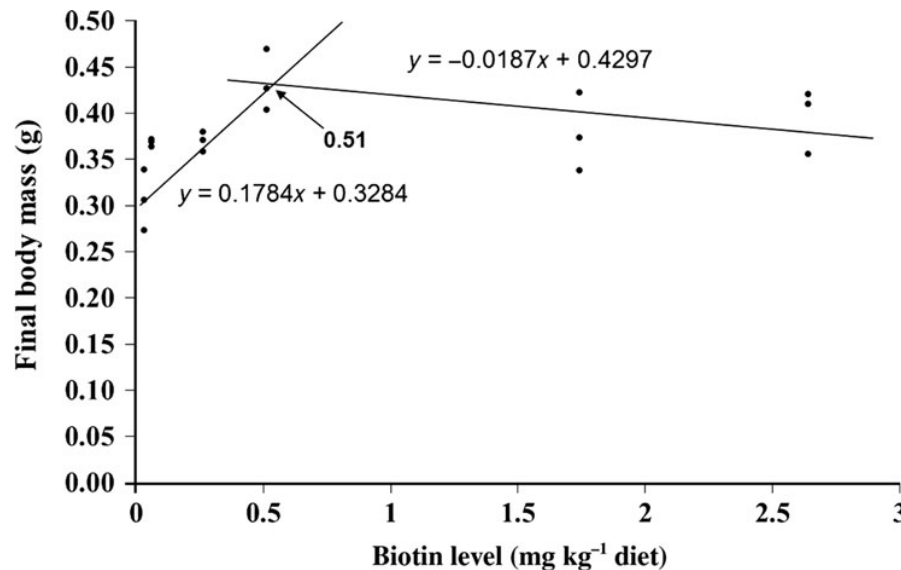
→ The right statistics to be used is the polynomial procedure

Aquaculture Nutrition: one challenge-Data

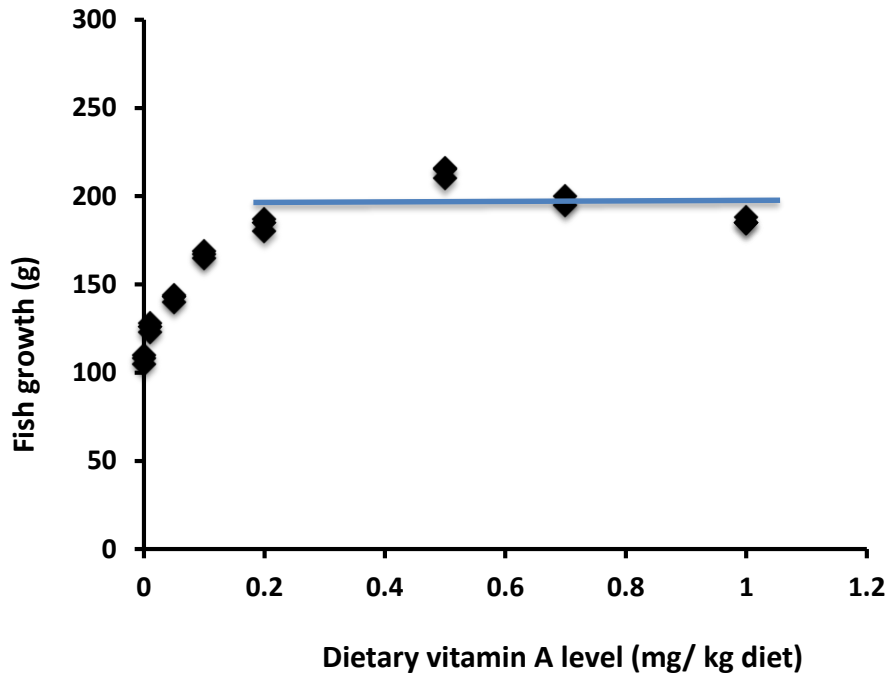
Table 2 Final mass, protein efficiency ratio (PER) and feed conversion ratio (FCR) of zebrafish (*Danio rerio*) fed diets supplemented with various biotin levels for 12 weeks^{*}.

Parameters	0.031	0.136	0.138	0.136	P-value	Pooled SEM
Initial mass (g)	0.136	0.136	0.138	0.136		
Final mass (g)	0.306 ^c	0.395 ^{ab}			0.0058	0.017
PER (g g ⁻¹) [†]	0.44 ^b				0.0257	3.537
FCR [‡]		1.88			0.0001	0.052

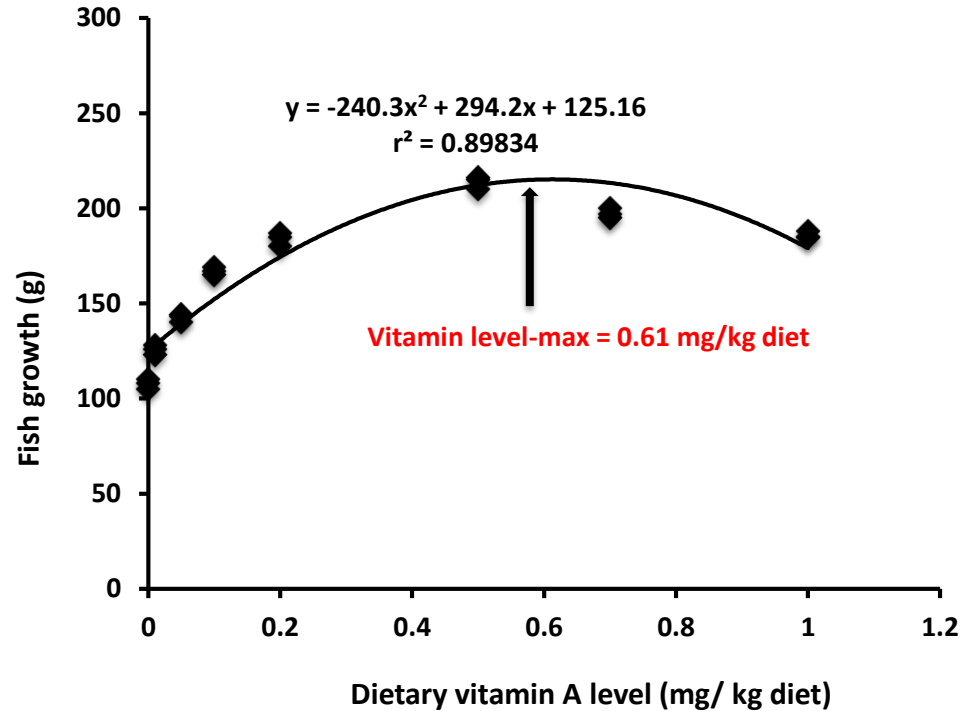
^{*}Means with different superscripts in a row are significantly different ($P < 0.05$) by Tukey's test.
[†]Protein efficiency ratio (PER) = (final wet mass (g) - initial wet mass (g)) / (Quantity of protein ingested (g) × protein content of the feed (g g⁻¹))
[‡]Feed conversion ratio FCR (g g⁻¹) = (Ingested feed (g) × Dry matter content of feed) / (final wet mass (g) - initial wet mass (g))



Aquaculture Nutrition: one challenge-Data

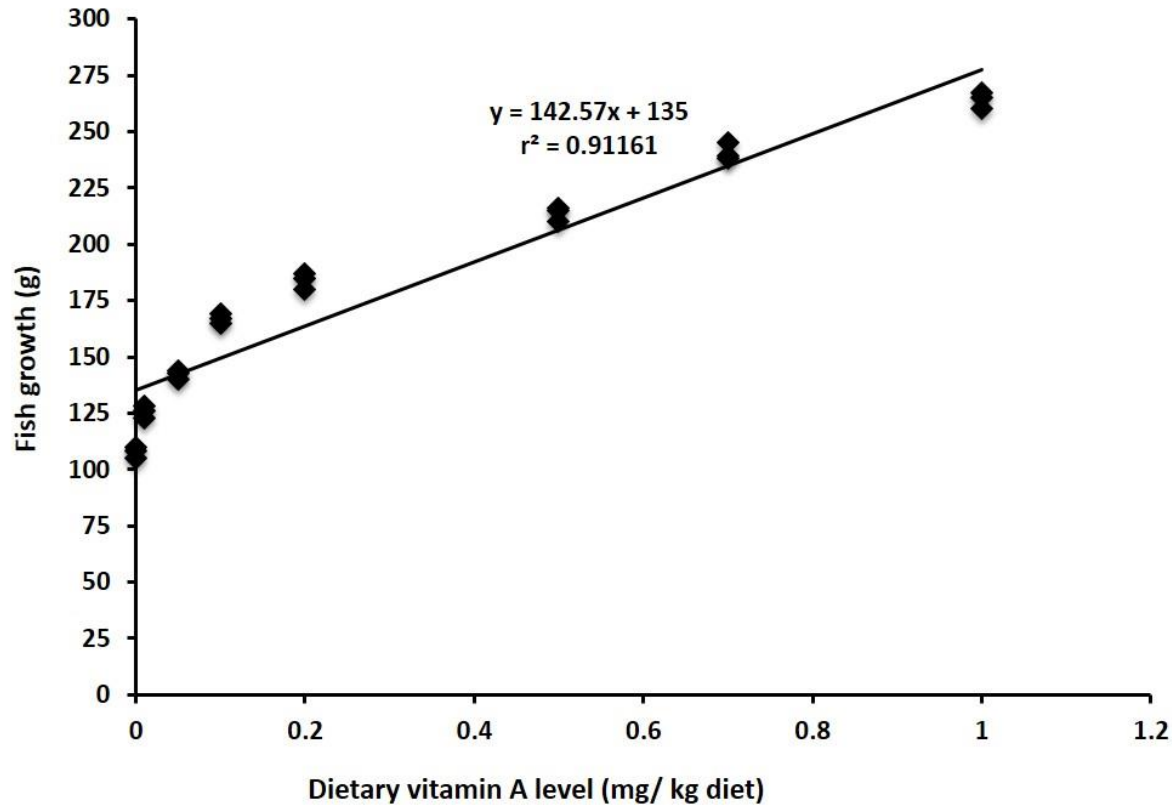


Multiple comparison test



Regression analysis

Aquaculture Nutrition: one challenge-Data



Regression analysis

Aquaculture Nutrition: Perspectives on Data

Professionalization of Aquaculturists ?

Consolidation of data, databases and relevant available information on annual basis

Aquaculture Nutrition: Perspectives on Data

Professionalization of Aquaculturists

Yossa, R. 2015. Towards the professionalization of aquaculture: Is there a need for certified professional aquaculturists?. *World Aquaculture* 46(2):22-23.

TOWARD THE PROFESSIONALIZATION OF AQUACULTURE: IS THERE A NEED FOR CERTIFIED PROFESSIONAL AQUACULTURISTS?

RODRIGUE YOSSA

Aquaculture is expected to be the primary source of seafood and to continue to play a major role in wealth generation, food security, human health and poverty alleviation in the future, especially in developing countries (FAO 2014). However, unregulated aquaculture development can generate more problems through social and environmental concerns than it may solve (Naylor *et al.* 2000). It is, thus, assumed that future growth in global aquaculture to satisfy the ever-increasing world seafood demand will be achieved only if aquaculture is developed in a responsible manner by true professionals (Williams *et al.* 2000, Cressey 2009, Brummett 2013). The purpose of this article is to initiate discussion on the need to officially define aquaculture as a distinct profession with experts with specific, certified aquaculture knowledge and skills as part of the effort to secure seafood for 9 billion people by 2050.

To describe the potential benefits of the professionalization of aquaculture, I will first elaborate on the limits of farm certification, then present some general approaches on professions and professional certifications and finally describe the prospects for certification of aquaculture professionals.

THE LIMITS OF FARM CERTIFICATION

Farm certification is a current available framework to ensure environmental sustainability and social responsibility of aquaculture, while maintaining its economic sustainability. Farm certification is performed according to standards developed by independent organizations, such as the Global Aquaculture Alliance, Aquaculture Stewardship Council, and ISO 14001 Environmental Management Systems on the basis of established economic, environmental and social principles and standards. These standards are adaptable to specific local and national regulatory systems, norms and values to support responsible aquaculture production on existing individual farms. Farm certification in aquaculture can also provide a market incentive to farmers, inasmuch as people are now, more than ever, concerned about the sustainability of production and traceability of the food they eat, especially in developed countries.

THERE IS A NEED FOR A NEW INSTITUTIONAL ARRANGEMENT THAT SPREADS PROFESSIONALISM WITHIN AQUACULTURE. THIS COULD BE ACHIEVED THROUGH THE ESTABLISHMENT OF AQUACULTURE AS A DISTINCT REGISTERED PROFESSION.

PROFESSIONAL CERTIFICATION VALIDATES THE EDUCATION AND TRAINING OF PROFESSIONALS. THE PROFESSIONALIZATION OF AQUACULTURE MIGHT INVOLVE THE ESTABLISHMENT OF A BOARD THAT REGULATES AND GUIDES AQUACULTURE PROFESSIONALS THROUGH THE PROFESSIONAL CERTIFICATION PROCESS. AQUACULTURE SOCIETIES, INCLUDING WAS, COULD ESTABLISH A "BOARD OF AQUACULTURE PROFESSIONALS" THAT WOULD OFFICIALLY GUIDE AQUACULTURE PROFESSIONALS TO ENSURE THAT AQUACULTURE IS PRACTICED WITH INTEGRITY AND THAT CERTIFIED PROFESSIONAL AQUACULTURISTS USE EXISTING SCIENTIFIC AND TECHNOLOGICAL KNOWLEDGE TO FIND RELEVANT ECONOMICALLY, ENVIRONMENTALLY AND SOCIALLY SUSTAINABLE SOLUTIONS TO THE CURRENT AND FUTURE CHALLENGES OF GLOBAL AQUACULTURE GROWTH.

Nevertheless, not all fish farms in the world can be certified because certification is voluntary and involves a cost to the producer. Thus, aquaculture farms seeking certification are usually big ventures, while the major part of global aquaculture production is achieved by small-scale aquaculture producers in developing countries. Hence, unless small-scale producers see more market opportunities and financial returns from investing already limited financial resources for farm certification, this will only contribute to the sustainability of aquaculture in a partial way, inasmuch as the pooled environmental impact of numerous small-scale aquaculture farms at the global level is important (Brummett 2013). Hence, to complement the current farm certification systems and tentatively reduce investment risks in the aquaculture industry, there is a need for a new institutional arrangement that spreads professionalism within aquaculture. This could be achieved through the establishment of aquaculture as a distinct registered profession.

GENERAL APPROACHES ON PROFESSIONS AND PROFESSIONAL CERTIFICATIONS

A profession is an occupation that requires a worker with specialized training and experience to perform one type of work or several specific tasks related to that work. Such a worker is called a professional. A profession is created to serve the needs of the society for a specific type of work or group of related work; hence a profession is specialized and allows professionals with specific knowledge and hands-on experience in a discipline to distinguish themselves from other "non-professional" workers by providing the best services possible to society.

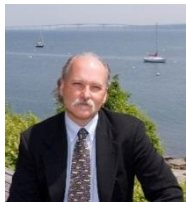
A professional can be unregistered, that is people deliberately use a professional title without being certified by any official professional board. A typical example in this category is "aquaculturist." Currently any person growing aquatic animals or plants can claim to be an aquaculturist, irrespective of training and experience in the field of aquaculture. Further, a professional can be registered, that is the professional has a professional board

Aquaculture Nutrition: Perspectives on Data

Interviews



Prof Patrick
Sorgeloos



Prof Barry
Costa-Pierce



Prof Claude
Boyd



Prof Tillmann
Benfey



Dr. Marc
Verdegem



Dr. Randall
Brummett



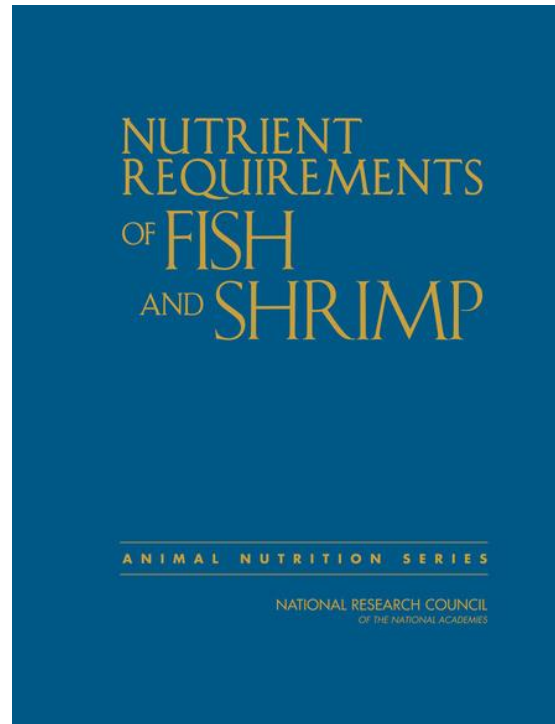
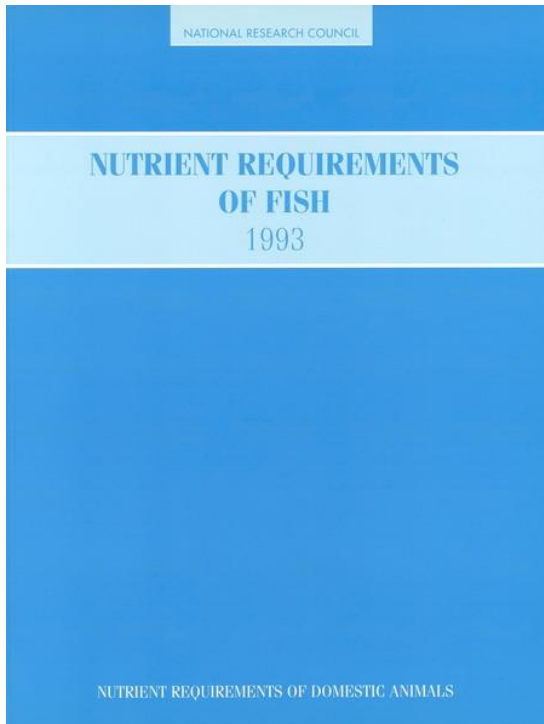
Mr Roy
Palmer



Dr. Santosh Lall

Aquaculture Nutrition: Perspectives on Data

Consolidation of data and information on requirements, ingredients, diets and feeds



Annual (and not every 2 decades)

National or regional (not just the US)

ISFNF should have a data section with metadada

More nutritional modeling

Aquaculture Nutrition: Perspectives on Data



A lot of Data is very good !

But need to know how to sort them out !

Consider “Quality Data & Relevant Information”!

Thank You



Feed the Future Bangladesh Aquaculture and Nutrition Activity



Thank You



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