

# FishBase Symposium 2015

## Captivating fishes / Fängslande fiskar

Swedish Museum of Natural History

19 October 2015



## Summary



**FishBase**



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riksmuseet

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Cover photo: Male of the critically endangered Mangarahara cichlid (*Ptychochromis insolitus*). ©ZSL London Zoo, photo used with permission.

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# FishBase Symposium 2015 – Captivating Fishes

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## Introduction

The theme for FishBase Symposium 2015 was *Captivating Fishes / Fångslande Fiskar*, a reference both to keeping fishes in captivity, and the fascinating nature of fishes. Today science and technology have advanced to the point that it is possible to keep almost any aquatic organism in recirculating systems. FishBase Sweden invited seven experts to give talks on different aspects of what captive maintenance and breeding has meant for conservation, for food production, and for the aquarium hobby.

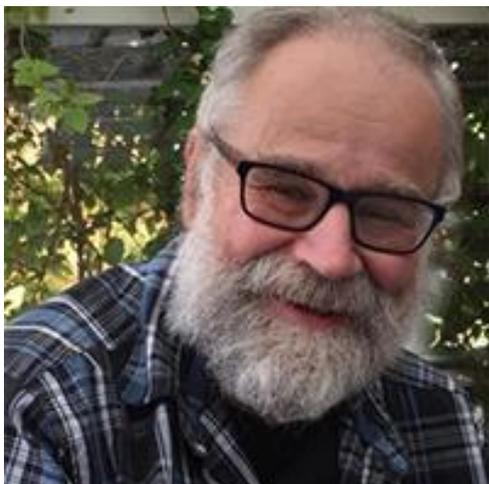
The 170 registered participants were treated to lectures on a wide range of topics: Scott Dowd of New England Aquarium spoke about how fishery for the aquarium trade could be a socioeconomic force for conservation. Brian Zimmerman of London Zoo outlined strategies to help zoos and aquaria save some of the most threatened freshwater fishes from extinction. Frank Kirschbaum of Humboldt-Universität zu Berlin discussed cyclicity and triggers in fish reproduction, and contrasted tropical fish to temperate sturgeon. Author and consultant Svein Fossaa talked about the history and future of the aquarium hobby, and the misguided efforts by animal rights groups to outlaw pets. Björn Källström of the Maritime Museum & Aquarium explained how public and private aquaria can cooperate to preserve genetic diversity in captive organisms. Björn Frostell of the Royal Institute of Technology and Anders Kiessling of the Swedish University of Agricultural sciences gave complementary talks detailing how aquaculture and hydroculture in high-intensive recirculating systems can help provide food safety as the planet's population grows. Videos of the lectures have been posted to FishBase Sweden's YouTube channel, FishBase's Facebook page, and the homepage of the Swedish Museum of Natural History.

This year's FishBase Symposium is the thirteenth FishBase symposium held in Stockholm, and it is now 25 years since FishBase started. During this time FishBase has grown from being a program on a CD-ROM to being the world's largest encyclopedia of fishes, available on the net and visited by over half a million unique visitors per month. As we continue to grow and update FishBase, we look forward to 25 more years of providing the world free access to information about fishes, and hope we meet again at next year's symposium!

## Moderator: Kjell Fohrman

*Author and aquarium consultant, Jonsered, Sweden*

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Moderator for the symposium is Kjell Fohrman, a nestor of the Swedish aquarium hobby. Kjell started breeding aquarium fish in the 1970's, and became an entrepreneur in the aquarium retail and wholesale business in Sweden and Germany. He is a member of several hobbyist organizations, has been chair of ZooRF (the National Swedish Association of the pet trade) and SPTU (Scandinavian Pet Trade Union), and editor of the journals *Ciklidbladet* and *Pet Scandinavia*. He's written over a thousand articles in different aquarium journals, published a large number of books, started Sweden's biggest aquarium website, Zoopet, and held courses in the legal and practical aspects of the keeping and trade of pets.

## Svein A. Fosså

*Author and freelance biology consultant, Grimstad, Norway*

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Svein A. Fosså, born 1959, is a biologist (ichthyologist), eager aquarist since childhood, and a leading international voice for responsible and sustainable practices in the ornamental aquatic trade. Svein has worked for and with the pet- and ornamental aquatic trade since 1986. In 1992 he started his own business as an independent author and advisor on aquarium technique, ichthyology, and pet- and ornamental aquatic trade policies and legislation worldwide.

Svein lectures regularly in many countries, and has authored and co-authored more than 400 articles, reports and other publications, including several internationally acclaimed books on marine aquarium keeping. Besides commissions for companies and institutions, Svein is currently President of the European Pet Organization (EPO), Secretary General of the Norwegian Pet Trade Association (NZB), co-organizer of the Norwegian ZooExpo trade shows, co-editor of the pet trade magazine PetScandinavia, and a member of the boards of the Ornamental Fish International (OFI), and the Scandinavian Pet Trade Union (SPTU). In the past he was also involved with the Marine Aquarium Council (MAC) as a Board member, and a liaison contact for Europe.

Svein has worked much on ethical and animal welfare issues related to the trade in live companion animals in general, and the ornamental aquatic trade in particular. He has been studying “man-made” ornamental fishes, produced by selective breeding, genetic engineering and physical manipulation. He is involved with issues of sustainable trade, invasive species and nature conservation in the ornamental aquatic trade, and he is OFI's official delegate on meetings relating to CITES.

Svein was born and raised in Norway, where he continues to live with wife and two children, in the small coastal town of Grimstad.

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### AQUARIUM KEEPING IN THE 21ST CENTURY: DOES IT HAVE A FUTURE?

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The keeping of fish for ornamental and hobby purposes has a long history, going back at least to ancient Egypt and Rome, and quickly developing into what we know as modern style aquarium keeping during the latter part of the 19th century in Europe. The availability of suitable and conditioned animals, as well as the knowledge about their biological demands, availability of technology and understanding of welfare has never been larger than today. Still the institution of fish keeping has also never been so heavily criticised as today. This talk looks at the state of present day home aquarium hobby and -trade, where the fish come from and how it is treated, and points out some of the challenges from conservation-, bioethics- and animal rights views. The overriding question is whether the individual and societal benefits gained from aquarium keeping are significant enough to justify its future.

## Brian Zimmerman

*ZSL London Zoo, London, United Kingdom*

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Brian Zimmerman has been the Curator of the Aquarium at the Zoological Society of London since 2007. Prior to that, he was the Team Leader at ZSL, starting in 1999. He previously worked in other aquarium collections and in his early career worked in the USA as Education Coordinator for Dallas Zoo and Dallas Aquarium. He spent two years on the small West Indian island of Nevis working for the US Peace Corps as a teacher of environmental education. He has a degree from the University of Wisconsin in Natural Resource Management. In Brian's role at ZSL he not only manages the Society's fish and aquatic invertebrate collection but also leads the Fish Net project which focuses on freshwater fish conservation around the world with key projects in Greece, Turkey and Madagascar. He has done biodiversity surveys in freshwater ecosystems around the world in places such as Liberia, Madagascar, Nepal, Brazil and Turkmenistan. He is a member of the IUCN's

Freshwater Fish Specialist Group, the Chair of the European Association of Zoos and Aquariums' FAITAG (Fish and Aquatic Invertebrate Taxonomic Advisory Group), sits on the Conservation Committees for EAZA and the European Union of Aquarium Curators, and is a member of EAZA's Translocation Working Group, Welfare Group and Transport Group. He has consulted for other zoos and aquarium including Barcelona Zoo, Jerusalem Zoo and Kastoria Aquarium and Crete-aquarium in Greece. His favourite fish is the La Palma pupfish.

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### GENETIC AND ENVIRONMENTAL COMPONENTS OF FISH SEX DETERMINATION AND DIFFERENTIATION

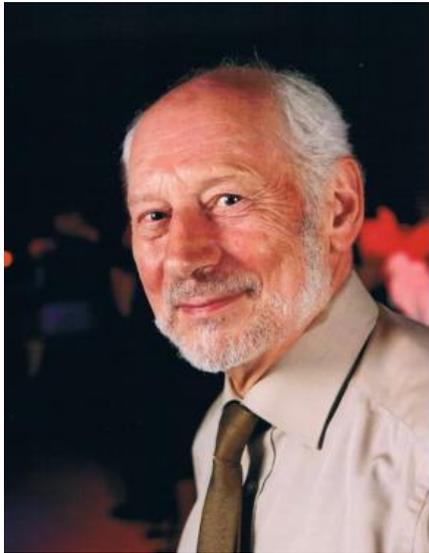
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Regional collection planning (RCP) is a tool used by zoos and aquariums around the world for population management of the species they keep. The relatively small captive populations held in each institution form a larger metapopulation in the regional collection that improves the long-term genetic viability of these species in captivity. Traditionally the RCP was used primarily to ensure that zoo animals no longer were obtained from the wild. However in recent years these metapopulations are being managed for conservation purposes. The European Union of Zoos and Aquariums (EAZA) Fish and Aquatic Invertebrate Taxonomic Advisory Group (FAITAG) recently held an RCP workshop aimed at freshwater fishes. The workshop was attended by a variety of specialists concerned with freshwater fish conservation – from the zoo/aquarium community, research institutes, universities and the aquarium hobby sector. The workshop identified priority species for which a captive management plan was deemed essential in order to safeguard their future. The presentation will discuss the process of Regional Collection Planning and highlight some of the challenges and opportunities.

## Frank Kirschbaum

Humboldt University Berlin, Berlin, Germany

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Prof. Dr. Frank Kirschbaum. Studies in Zoology, Botany, Chemistry, and Genetics at Cologne and Tübingen Universities. PhD on color pattern of zebra fish at Cologne University (1972). Postdoc at the French CNRS for five years on reproduction and development of weakly electric fishes (South American knifefishes, African mormyrids). 10 years as Assistant Professor at Cologne University. Then for 3 ½ years at Free University in Berlin working on lower vertebrates as model organisms for teratological studies. From 1992 – 2007 head of the Department Biology and Ecology of Fishes at Leibniz-Institute of Freshwater Ecology and Inland Fisheries and Professor at Humboldt University Berlin. In particular studies on the restoration of the European sturgeon, *Acipenser sturio*, in Germany. Since 2007 retired; continuation of teaching and research at Humboldt University.

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### CYCLICAL REPRODUCTION IN FRESHWATER FISHES: TROPICAL FRESHWATER FISHES VERSUS STURGEON

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Fish reproduce either continuously once they have attained sexual maturity or they reproduce once sexually mature cyclically depending on environmental factors triggering gonadal recrudescence. In this talk data on the cyclical reproduction of some freshwater fishes are presented. The cyclical reproduction of tropical freshwater fishes (South American knifefishes, African mormyrid fishes, African and Asian catfishes) is triggered by environmental factors such as conductivity, water level, and imitation of rain factors which vary in relation to the occurrence of dry and rainy season conditions. Sturgeon (27 species are recognized) also reproduce cyclically, however, the ripening of the gonads, in particular in the females, often takes more than one year and is triggered by temperature changes. Successful artificial reproduction in the European sturgeon, *Acipenser sturio*, has allowed starting restoration measures in European Rivers, in particular in France and Germany.

## Scott Dowd

*New England Aquarium, Boston, Massachusetts, USA*

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Scott Dowd has served as a biologist at the New England Aquarium (NEAq) since 1987. He also co-founded, and is now Executive Director of Project Piaba (piaba is the local name for the ornamental fish). The Mission of Project Piaba is to increase the environmental, animal welfare, and social sustainability of the Amazonian aquarium fish trade, to develop and incorporate metrics through which this progress can be assessed, and to provide mechanisms to promote this industry. Project Piaba's work is also featured on the NEAq website, and on Facebook.

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### THE HOME AQUARIUM INDUSTRY AS AN INSTRUMENT OF CONSERVATION

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Throughout the tropics many communities base their livelihoods on the capture and export of living aquatic organisms for the global trade in specimens for the home aquarium hobby. This industry, based on the collection of living animals for the sole purpose of a hobby, entertainment, parlour decor, is indeed controversial. In fact EU Parliamentary Members are currently considering legislative controls, especially in regard to wild-sourced stocks. For more than 25 years, Project Piaba has been studying the aquarium fishery of the Rio Negro Basin, Amazonas State, Brazil. Findings have shown that the fishery represents little to no threat to fish populations. Beyond that, the fishery resource provides the basis of livelihoods for the majority of regional residents. Human welfare is directly tied to environmental welfare via the fish, which has resulted in a very effective driver of environmental stewardship. The protection from fishers is directed towards the entire ecosystem that the fishes depend on. The forest ecosystem is also critical habitat for many critically endangered species. There are incalculable quantities of carbon sequestered in the trees protected by the fishers and the tropical forest continues atmospheric scrubbing processes. Outcomes: poverty alleviation, protection of areas of critical biological importance that would otherwise likely be lost, and mitigation for climate change. These accomplishments that have been documented in the Rio Negro fishery are not unique to this region. It is clear that variations of the model exist throughout the tropics. Zoos and aquariums are in an extremely good position to foster these beneficial outcomes by showcasing these examples to our visitors in our programs and exhibits. By fostering the market demand for beneficial aquarium fishes, we can have a positive impact on people and ecosystems in regions most important to us.

## Björn Källström

*Maritime Museum & Aquarium, Gothenburg, Sweden*

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Björn Källström is a marine biology researcher and head of the Aquarium at the Maritime Museum & Aquarium in Gothenburg, Sweden. Björn is an active PADI open Water Scuba Instructor and an Advanced European Scientific Diver (AESD). He is involved in the development of scientific diving in Sweden and is a member of the Swedish Scientific Diving Panel as well as the management board for the Vocational Diving Training School (YRGO) in Gothenburg. Björn is also involved in the development of the Underwater Observatory in the Gullmarn fjord at the Swedish west coast. Björn's research focuses on conservation genetics of marine species including seagrasses, sharks and stony corals. Björn has founded the Aquarium Oceanographic Laboratory which makes it possible to combine the public part of the aquarium at the Maritime Museum & Aquarium with scientific research on marine

organism and to start conservations projects for threatened species.

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### TOWARDS A NEW CONSERVATION STRATEGY - DISTRIBUTED LIVING GENE BANKS IN PUBLIC AND PRIVATE AQUARIUMS

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Marine species are subjected to many different stressors, including climate change, ocean acidification and over fishing, which threatens natural populations and species with extinction. In order to save species from extinction in the wild conservation projects can include threatened species held in captivity in aquariums as living gene banks. The objective of this project is to use existing private and public aquariums to build distributed repositories for threatened marine species. The species in the repositories will be used to start breeding programs and for research to investigate taxonomy, genetic diversity and resilience to different stressors. The repositories are distributed since they include specimens held in private as well as in public aquariums. An important component in the projects is to gather and document the acquired knowledge from the private aquarist of how to best keep marine species in captivity, including successful culturing and breeding techniques.

In order to investigate the feasibility of the distributed repository model we have created an ex-situ, distributed repository of tropical stony corals in Swedish public and private aquariums. We have collected genetic data (nuclear microsatellite data and mitochondrial sequence data) from 30 coral clones of the Birds nest coral, *Seriatopora hystrix*. The corals in the investigation were provided both by private aquarists as well as by public aquariums in Sweden. The results from the investigations show that there are unexpectedly high genetic diversity in Swedish aquariums measured as clonal diversity and allelic richness. The results also indicates that the Swedish mitochondrial haplotypes are most similar to an "Upper Slope genotypes" growing on medium depths in wild populations of *Seriatopora hystrix* at the Great Barrier Reef. In order to investigate the resilience of the corals in the repository to

ocean acidification a sub sample of the clones were subjected varying levels of pH (7,5 – 8,4) in controlled experiments. The results from the ocean acidification experiments showed a reduced growth with lowered pH-values, indicating that *Seriatorpora hystrix* is sensitive to ocean acidification.

In another investigation we used an existing repository of the Small spotted catshark (*Scyliorhinus canicula*) in public aquariums in Sweden. The sharks in the repository are used in a conservation project aiming at restocking Swedish wild populations. The project suffers from a low number of breeding individuals which potentially results in low genetic diversity in the offspring. Molecular data was collected from sharks from three public aquariums in Sweden and from sharks imported from a research aquarium in France to be eventually included in the breeding program. The sequence data was also compared to published genetic sequences from wild populations. Preliminary results from the study indicate that sharks in the study, from Sweden and France, belong to the same genetic population and that the French sharks potentially can be included in the breeding program in order to increase genetic diversity.



## Björn Frostell

*Royal Institute of Technology (KTH), Stockholm, Sweden.*

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Björn Frostell has his affiliation as a Professor in Industrial Ecology at KTH in Stockholm. Industrial Ecology is a young science that tries to understand society's physical resource metabolism (energy and materials) and maintain it within ecologically sustainable boundaries. Important aspects of Björn Frostell's work cover the identification and quantification of important physical resource flows. A long term aim of the work is to contribute to the introduction of physical resource accountings in society – and technical and organizational means to manage important physical resource flows at different administrative levels. Björn Frostell's interest in fish and fish cultivation stems from a belief that future protein supply to humanity has to become more resource efficient than today. Much evidence points at the possibility that fish could

be produced with much less use and wastage of physical resources than meat and thus could contribute to a more sustainable protein supply.

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### FISH – PART OF AN ALTERNATIVE ANIMAL HUSBANDRY?

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Man's consumption of meat, pork, mutton and poultry (in general tissue from land-living animals and here referred to as meat) is rapidly increasing. The main drivers behind this development are (i) a rapidly increasing world population and (ii) a rapidly increasing global economic growth, both as such and per capita. However, meat consumption is accompanied by an intense use of different physical resources such as energy, water, fertilizers and chemicals. It is now being increasingly questioned whether meat consumption on earth can increase in the same way as hitherto. Fish is an alternative source of valuable protein and an important protein source for many populations. However, global fishing already since 25 years surpasses the sustainable level of fish harvest from seas, lakes, rivers and ponds. This has led to fish aquaculture being one of the most rapidly growing businesses worldwide, with an annual growth rate of up to 20 %. This development is, however, not without problems. Current trends point at an increasing scale of operations, resulting in both doubtful animal ethics and environmental problems. Invasive organisms are difficult to control and the inefficient resource eco-cycles in flow-through systems cause environmental problems with nutrient overload and local accumulations of fish feed residues and fish faeces. Here, combinations of fish cultivation and horticulture could provide interesting future prospects. The presentation tries to cover both the possibilities with an increased fish supply and the challenges caused by current large scale operations. Will it be possible to develop a profitable small-scale (50-100 tons of fish per year) closed loop protein and vegetable production system where fish is our new domestic animal?

## Anders Kiessling

*Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden*

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Anders Kiessling has been Faculty Professor in Aquaculture at the Swedish University of Agricultural Sciences, since 2011.

Through his career his research has been nutrition, product quality and welfare in farmed fish but present main focus is sustainable animal feed sources, as bio-protein and feed mussel meal, in combination with integrated and multi trophic farming systems. He has published 100 articles in peer reviewed journals. Among international assignments, he has been MC member, vice-chair and chair of COST networks in meat and fish quality, fish nutrition, and welfare of farmed fish, respectively before becoming a DC member. At Baltic Sea level he represents aquaculture in the Bonus Drafting team, in HELCOM he is activated in the dialogue

related to Baltic wide aquaculture recommendations. He is a member of the steering comity of the BSR project Aquabest, responsible for the work package, "Closing the nutrient loop". He is a member of the drafting team for the flagship application *Baltic Blue Growth* (feed mussel). At national level he is a member of the Governments National advisory board for aquaculture and was active both as a member of the steering comity of the national action plan for aquaculture and as a member of the expert panel of the Governmental report SOU2009:26, "Sweden an aquaculture nation in making". Internationally he is a member of Stirling University aquaculture advisory group and the main supervisor for aquaculture in the SIDA supported project, Merkan II, with projects both in Cambodia and Vietnam, both related to sustainable feed sources to farmed fish and crustaceans.

From 2003 to 2010, he was Professor in fish nutrition at UMB in Oslo, and from 1998 to 2003, Senior Scientist at IMR, Bergen. In 1996, he obtained his Assistant Professorship in aquaculture at SLU. From 1992 to 1998, he was Researcher at SLU, and from 1990 to 1992, did his post doc at DFO, West Vancouver lab. Canada. He got his PhD at SLU in 1990.

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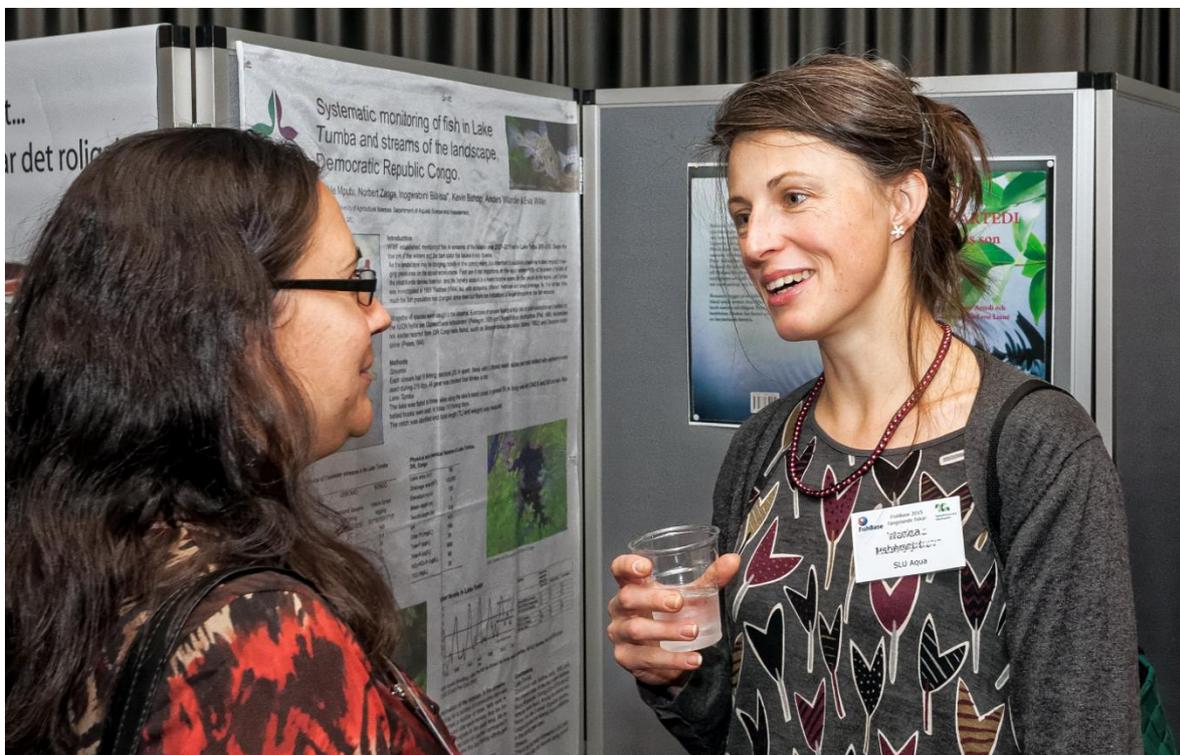
### AQUACULTURE THE MISSING LINK IN CIRCULAR PRODUCTION SYSTEMS

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A growing population, urbanization and rapid globalization of economy pose growing challenges to our food supply. This has up to now been met by intensified agriculture and aquaculture, e.g. involving increased land and water use, crop and species development, mechanization, fertilization and high energy use. This development will have to be at least partially reoriented to less land-intense, less energy-intense and more eco-cycle oriented methods. Other important demands are safety of food supply, high food quality and an ethical handling of animals. This presentation focuses the role of aquaculture in this development. By combining terrestrial and aquatic closed and semi closed systems into integrated and multi trophic farming systems utilizing no arable land, low freshwater resources and waste streams of energy and nutrients it is possible to formulate sustainable and circular systems possible to locate in both urbane and more rural settings.



**Organizers and speakers of FishBase Symposium 2015.** From top left: Bodil Kajrup, Anders Kiessling, Michael Norén, Brian Zimmerman, Björn Källström, Sven Kullander, Kjell Fohrman, Svein A. Fosså, Frank Kirschbaum, Björn Frostell.



A record number of participants took the opportunity to display posters.



Audience



Audience



Coffee break mingle



Coffee break mingle



*Many members of the audience took the opportunity to talk to the speakers*



*FishBase Sweden would like to thank all speakers and participants for making FishBase Symposium 2015 a success, and hope to see you all again next year, at FishBase Symposium 2016!*

## Participant list FishBase Symposium 2015

### **Speakers**

Svein A. Fosså	Author, freelance biology consultant, Grimstad, Norway
Brian Zimmerman	ZSL London Zoo, London, UK
Frank Kirschbaum	Humboldt-Universität zu Berlin, Berlin, Germany
Scott Dowd	New England Aquarium, Boston, USA
Björn Källström	Maritime Museum & Aquarium, Gothenburg, Sweden
Björn Frostell	KTH Royal Institute of Technology, Stockholm, Sweden
Anders Kiessling	SLU Swedish University of Agricultural Sciences, Uppsala, Sweden

### **Moderator**

Kjell Fohrman	Aquarium consultant, Jonsered, Sweden
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### **Participants**

Hans Ackefors	
Markus Sällman Almén	Uppsala universitet
Tony Andersson	Akvarieleasing AB
Gunnar Anéer	
Björn Ardestam	SLU Aqua
Emma Asterhag	Stockholms universitet
Samuel Avraham	Stockholms universitet
Thomas Axenrot	SLU Aqua
Veneta Belivanova	Naturhistoriska riksmuseet
Kristian Benkö	Aquaria Vattenmuseum
Håkan Berg	Stockholms universitet
Gunnar Berglund	Stockholms stad
Bo Björnsäter	
Jimmy Blom	Länsstyrelsen Sörmland
Bertil Borg	Stockholms universitet
Hans Bostrand	
Ellen Bruno	Naturskyddsföreningen
Daniel Brännström	Nattviken invest
Björn Centergren	Stockholms stad
Nichlas Dahlén	Länsstyrelsen Gävleborg
Staffan Danielsson	Havs- och vattenmyndigheten
Lennart Davidsson	Havets Hus
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Bernd Dinse	Haninge Akvarieförening
Emily Dock Åkerman	Naturhistoriska riksmuseet
Larisa Doguzhaeva	Naturhistoriska riksmuseet

Charlotte Eke-Göransson	
Eva Eke-Göransson	
Michael Eklund	Akvarieleasing AB
Mattias Ekstedt	Aquaria Vattenmuseum
Åsa Enefalk	Karlstads universitet
Ricky Eriksson	
Lisa Ewerlöf	Näringsdepartementet
Jens Fahlström	Sjöfartsmuseet Akvariet
Carl-Axel Fall	Sveriges Natur
Suzanne Faxneld	Naturhistoriska riksmuseet
Göran Flodin	Akvarievärlden
Martin Franzén	Akvarievärlden
Gun Frostling	författare
Frida Gebel	Sjöfartsmuseet Akvariet
Peter Giegold	DOMTOM GREEN AB
Thomas Giegold	Stockholms universitet
Annie Grannas	Spånga Gymnasium
Emily Gripenstam	Akvarievärlden
Albin Gräns	SLU
Karl Gunnarsson	Miljömagasinet
Stina Gustafsson	Karlstads universitet
Tatjana Haitina	Uppsala universitet
Nils Hedberg	Stockholms universitet
Per Hedberg	marinefishlarvae.com
Eva Hellberg	Riksmusei vänner
Per Hellqvist	Akvarieleasing AB
Andrea Hennyey	Stockholms universitet
Patrik Henriksson	Stockholm Resilience Center
Mikael Himberg	Åbo akademi
Philipp Hirsch	Basel University
Gusten Hollari Holmberg	
Thorbjörn Hongslo	SVA
Ola Håkansson	Marina läroverket
Oskar Häger	Aquaria Vattenmuseum
Stefan Iderström	
Sven Jakobsson	Stockholms universitet
Roger Jansson	Havets Hus
Irén Johnsson	PFG Hamn AB
Karl Johnsson	PFG fish AB
Leif Jonsson	LJ-osteology
Tove Jörgensen	Stockholms universitet
Bodil Kajrup	Naturhistoriska riksmuseet
Oliver Karlöf	Stockholms stad
Lena Konovalenko	Stockholms universitet

Karin Sindemark Kronestedt	Naturhistoriska riksmuseet
Sven O Kullander	Naturhistoriska riksmuseet
Bo Leander	SWECO AB
Cecilia Lenbäck	KRAV
Simon Eckerström Liedholm	Stockholms universitet
Joakim Ljungqvist	Akvariebaronen
Sverker Lovén	Stockholms stad
Lars Lundahl	Länsstyrelsen Blekinge
Morgan Lundberg	Spånga Gymnasium
Stefan Lundberg	Naturhistoriska riksmuseet
Sven Lundgren	Akvarieleasing AB
Tyrone Lundström	
David Lundvall	Länsstyrelsen Dalarna
Emil Maier	Haninge Akvarieförening
Tanja Martins	SLU Aqua
Calle Mattsson	
Inger Melander	WWF
Mariana Mesherkakova	SLU Aqua
Daniel Molin	
Veronica Morin	Marina läroverket
David Mårding	Aquaria Vattenmuseum
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Sture Nellbring	
Calle Nellbring	Naturhistoriska riksmuseet
Tam NguyenThanh	Stockholms universitet
Mathias Nilsson	
Mats Nordenskjöld	Stockholms universitet
Michael Norén	Naturhistoriska riksmuseet
Lennart Nyman	Man and Water AB
Desirée Nyman	Svensk Fiskodling AB
Daniel Nyqvist	Karlstads universitet
Christer Olburs	
Björn Oliviusson	Haninge kommun och KTH
Owe Olsson	Haninge Akvarieförening
Lars-Olof Omfors	Stockholms Akvarieförening
Mathias Palm	Riksmusei Vänner
Bo Persson	Rekarne Vattenbruk AB
Anna Persson	Naturhistoriska riksmuseet
Tove Porseryd	Södertörns högskola
Jörgen Rask	SLU Aqua
Sven Rex	Stockholms Akvarieförening
Kjell Rosén	
Kristel Rosenfeldt	Stockholms universitet
Chrysoula Roufidou	Stockholms universitet

Piotr Rowinski	Stockholms universitet
Carl-Johan Rubin	Uppsala universitet
Linnea Rundgren	Linearimaging
Jannikke Räikkönen	Naturhistoriska riksmuseet
Owe Salomonsson	Haninge Akvarieförening
Johnny Sandberg	
Loke von Schmalensee	Stockholms universitet
Susanna Schröder	Naturvårdsverket
Olivia Selander	Stockholms universitet
Erik Simonsson	
Helen Sköld	Havets Hus
Henrik Ragnarsson Stabo	SLU Aqua
Anders Stark	DFEN
Barbro Stark	Livsmedelsverket
Thomas Strid	Huddinge kommun
Caroline Strindmar	Yasuragi
Sara Sundquist	Visita
Ingvar Svanberg	Uppsala universitet
Lisa Svensson	Utrikesdepartementet
David Sällström	Sjöfartsmuseet Akvariet
Björn Tengelin	Norconsult AB
Markus Thiel	
Philip Thomson	Stockholms universitet
Lars Thorsson	Milva AB
Viktor Thunell	
Robban Tranefalk	Aquaria Vattenmuseum
Diana Waage	Lantfisk AB
Lotten Wahlund	JTI - Institutet för Jordbruks- och Miljöteknik
Johan Watz	Karlstads universitet
Håkan Wickström	SLU Aqua
Ulf Wiel-Berggren	Fritidsfiskare
Tomas Viktor	IVL Svenska miljöinstitutet
Eva Willén	SLU
Rickard Yngwe	
Solveig Nordin Zamano	Anundsjö hembygdsförening
Erik Åhlander	Naturhistoriska riksmuseet
Ola Öberg	Svensk Fiskodling AB
Johan Östergren	SLU Aqua



## FishBase Symposium 2015 — Captivating Fishes

### Programme

- 09:00 - 09:30 Registration, coffee and sandwiches  
Moderator: **Kjell Fohrman**, Aquarium consultant.
- 09:30 - 09:35 Opening, **Michael Norén**, FishBase Sweden.
- 09:35 - 10:20 **Svein Fossaa**, Author and freelance biologist: *Aquarium keeping in the 21st Century: does it have a future?*
- 10:20 – 10:50 Fruit break
- 10:50 – 11:35 **Brian Zimmerman**, ZSL London Zoo: *The European Association of Zoos and Aquariums regional collection planning process – one strategy for saving the most threatened freshwater fishes from extinction.*
- 11:35 – 12:20 **Frank Kirschbaum**, Humboldt-Universität zu Berlin: *Cyclical reproduction in freshwater fishes: tropical freshwater fishes versus sturgeon.*
- 12:20 – 13:20 Lunch break
- 13:20 – 14:05 **Scott Dowd**, New England Aquarium: *The home aquarium industry as an instrument of conservation.*
- 14:05 – 14:50 **Björn Källström**, Maritime Museum & Aquarium: *Towards a new conservation strategy - distributed living gene banks in public and private aquariums.*
- 14:50 – 15:20 Coffee break
- 15:20 – 16:05 **Björn Frostell**, KTH Royal Institute of Technology: *Fish – part of an alternative animal husbandry?*
- 16:05 – 16:50 **Anders Kiessling**, Swedish University of Agricultural Sciences: *Aquaculture the missing link in circular production systems.*
- 16:50 – 17:00 Symposium Close

Time: Monday, 19<sup>th</sup> October 2015, 09:00 – 17:00.

Place: Main Auditorium (Stora hörsalen), Swedish Museum of Natural History, Frescativägen 40, Stockholm.



## FishBase Symposium 2015 — Fångslande Fiskar

### Program

- 09:00 - 09:30 Registrering, kaffe och smörgås  
Moderator: **Kjell Fohrman**, akvariekonsult.
- 09:30 - 09:35 Inledning, **Michael Norén**, FishBase Sweden.
- 09:35 - 10:20 **Svein Fosså**, författare och biologkonsult: *Aquarium keeping in the 21st Century: does it have a future?*
- 10:20 – 10:50 Fruktpaus
- 10:50 – 11:35 **Brian Zimmerman**, ZSL London Zoo: *The European Association of Zoos and Aquariums regional collection planning process – one strategy for saving the most threatened freshwater fishes from extinction.*
- 11:35 – 12:20 **Frank Kirschbaum**, Humboldt-Universität zu Berlin: *Cyclical reproduction in freshwater fishes: tropical freshwater fishes versus sturgeon.*
- 12:20 – 13:20 Lunch
- 13:20 – 14:05 **Scott Dowd**, New England Aquarium: *The home aquarium industry as an instrument of conservation.*
- 14:05 – 14:50 **Björn Källström**, Sjöfartsmuseet Akvariet: *Towards a new conservation strategy - distributed living gene banks in public and private aquariums.*
- 14:50 – 15:20 Kaffepaus
- 15:20 – 16:05 **Björn Frostell**, KTH Kungliga Tekniska Högskolan: *Fish – part of an alternative animal husbandry?*
- 16:05 – 16:50 **Anders Kiessling**, Sveriges Lantbruksuniversitet: *Aquaculture the missing link in circular production systems.*
- 16:50 – 17:00 Avslutning

Tid: Måndag 19:e oktober 2015, 09:00 – 17:00.

Plats: Stora hörsalen, Naturhistoriska riksmuseet, Frescativägen 40, Stockholm.