

Hans van de Vis · Anders Kiessling  
Gert Flik · Simon Mackenzie *Editors*

# Welfare of Farmed Fish in Present and Future Production Systems

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# Welfare Of Farmed Fish In Present And Future Production Systems

**Susan Healy, Felicity Ann  
Huntingford, Becca Franks**



## **Welfare Of Farmed Fish In Present And Future Production Systems:**

*Welfare of Farmed Fish in Present and Future Production Systems* Hans van de Vis, Anders Kiessling, Gert Flik, Simon Mackenzie, 2012-09-19 The book entitled *Welfare of farmed fish in present and future production systems* summarises the view of more than 80 experts in the field of fish welfare collected over a period of more than five years in an international network entitled *Welfare of Fish in European Aquaculture Cost action 867* which was sponsored by the COST Office COST is the acronym for European Cooperation in Science and Technology During the time of the action a shift became evident in the general perception of fish welfare It now not only includes variables with very direct effects on growth and thereby the economy of the farmer such as disease water and feed quality but the term also includes fish preferences and biology based stimulation measures This Cost action has contributed to the notion that welfare sets biological criteria for a sustainable production system We present the reader with an overview of the results obtained which can help to guide the way towards welfare of farmed fish in present and future production systems The first chapter gives an overview of the scientific papers that follow All scientific papers and the first chapter were previously published in *Fish Physiology and Biochemistry* vol 38 number 1 2012 Given the accruing interest in fish welfare in society each of these scientific papers should be accessible for stakeholders that are not part of the research community For that reason each of the scientific papers is preceded by a summary for non experts Previously published in *Fish Physiology and Biochemistry* vol 38 number 1 2012 *Welfare of fishes in aquaculture* Food and Agriculture Organization, 2019-08-06 The welfare of fish in aquaculture is of increasing public concern in Europe and thus of growing importance for fish farmers Although the topic can be regarded as controversial due in particular to the lack of available knowledge there is nevertheless an urgent need for fish farmers authorities and scientists to develop criteria approaches and practices to monitor and safeguard the welfare of cultured fish The objective of this document is to provide the opinion of EIFAAC Member institutions as the reference body in the field of inland fisheries and aquaculture on how given the current state of scientific knowledge fish welfare issues can be integrated into best practice guidelines for fish culture This report deals with the welfare of farmed finfish and neither addresses capture fisheries be they commercial or recreational nor welfare issues related to the culture of crustaceans and molluscs The report focuses on the welfare issues of on growing fish while giving little to no attention to larvae fry and broodstock Likewise the report focuses primarily on the culture conditions for farming of fish and gives little attention to welfare aspects related to transport and slaughter Finally emphasis is given to the culture of freshwater fish but marine species are included where appropriate It is understood that the principal welfare issues are comparable for freshwater and marine fish culture The Welfare of Fish Tore S. Kristiansen, Anders Fernö, Michail A. Pavlidis, Hans van de Vis, 2020-07-01 This book investigates how fish experience their lives their amazing senses and abilities and how human actions impact their quality of life The authors examine the concept of fish welfare and the scientific knowledge behind the inclusion of fish within the moral circle and how

this knowledge can change the way we treat fish in the future In many countries fish are already protected by animal welfare legislation in the same way as mammals but in practice there is still a major gap between how we ethically view these groups and how we actually treat them The poor treatment of fish represents a massive animal welfare problem in aquaculture and fisheries both in terms of the number of animals affected and the severity of the welfare issues Thanks to its interdisciplinary scope this thought provoking book appeals to professionals academics and students in the fields of animal welfare cognition and physiology as well as fisheries and aquaculture management

Welfare of Farmed Fish in Present and Future Production Systems Hans van de Vis, Anders Kiessling, Gert Flik, Simon Mackenzie, 2012-11-13 The book entitled Welfare of farmed fish in present and future production systems summarises the view of more than 80 experts in the field of fish welfare collected over a period of more than five years in an international network entitled Welfare of Fish in European Aquaculture Cost action 867 which was sponsored by the COST Office COST is the acronym for European Cooperation in Science and Technology During the time of the action a shift became evident in the general perception of fish welfare It now not only includes variables with very direct effects on growth and thereby the economy of the farmer such as disease water and feed quality but the term also includes fish preferences and biology based stimulation measures This Cost action has contributed to the notion that welfare sets biological criteria for a sustainable production system We present the reader with an overview of the results obtained which can help to guide the way towards welfare of farmed fish in present and future production systems The first chapter gives an overview of the scientific papers that follow All scientific papers and the first chapter were previously published in Fish Physiology and Biochemistry vol 38 number 1 2012 Given the accruing interest in fish welfare in society each of these scientific papers should be accessible for stakeholders that are not part of the research community For that reason each of the scientific papers is preceded by a summary for non experts Previously published in Fish Physiology and Biochemistry vol 38 number 1 2012

Aquaculture, 2020-12-01 Fish Physiology Volume 38 in this ongoing series examines how the inherent potential of fish to express traits of economic value can be realized through aquaculture Topics covered include the regulation of the reproductive cycle of captive fish shifting carnivorous fish towards plant based diets defining the challenges opportunities and optimal conditions for growth under intensive culture including in Recirculating Aquaculture Systems enhancing immune function and fish health during culture identifying and managing maladaptive physiological responses to aquaculture stressors establishing welfare guidelines for farmed fish phenotypic and physiological responses to genetic modification Zebrafish as a research tool and the aquaculture of air breathing fish Contains contributions from an international board of authors each with decades of aquaculture expertise Provides the most up to date information on the fundamental role that physiology plays in optimizing fish performance in aquaculture Provides the latest release in the Fish Physiology series that tackles how the manipulation of biological processes can be used to maximize the expression of beneficial production traits in fish aquaculture

**Preslaughter handling and slaughter of meat animals**

Luigi Faucitano,2023-08-14 Preslaughter handling and slaughter of meat animals is unique because it covers the entire period of preslaughter period and slaughter and its effects on the welfare of multiple species destined for meat production Several chapters describe the current knowledge on all welfare topics from pre transport preparation at the farm to stunning and slaughter and the assessment of animal welfare and stress through physiological behavioural and meat and carcass quality measures Other chapters cover new and important topics such as mobile slaughter and preslaughter handling and slaughter of non traditional meat species This unique and comprehensive work is written by internationally renowned experts and accomplished scientists in the field who are engaged in active research laboratories and who have demonstrated their devotion to animal care and welfare This work will be of interest and relevance to animal scientists academics students animal welfare and industry associations policy makers veterinarians livestock and poultry chain stakeholders and all those involved in and who care about the humane handling of meat species      *Aquaculture* John S. Lucas,Paul C. Southgate,Craig S. Tucker,2019-01-22

A clear illustration of the important role of aquaculture in supporting food security livelihoods and economic development around the world This new edition of *Aquaculture Farming Aquatic Animals and Plants* covers important aspects of the culture of fish shellfish and algae in freshwater and marine environments Subject areas covered include principles of aquaculture water quality environmental impacts of aquaculture desert aquaculture reproduction life cycles and growth genetics and stock improvement nutrition and feed production diseases vaccination post harvest technology economics and marketing and future developments of aquaculture Separate chapters also cover the culture of algae carps salmonids tilapias catfish marine and brackish fishes soft shelled turtles barramundi marine shrimp mitten crabs and other decapod crustaceans bivalves gastropods and ornamental species This edition also provides greater coverage of aquaculture in China reflecting the country s importance in the global scene Providing core scientific and commercially useful information and written by 35 eminent international authors this expanded and fully updated Third Edition of *Aquaculture* is essential reading for all students and professionals studying and working in aquaculture Fish farmers hatchery managers and those in aquaculture support and supply industries such as feed manufacturing will find an abundance of commercially useful information within this important and now established book Describes the multitude of developments that have occurred within the aquaculture field over the last 15 years Includes a major revision of production statistics and trends discussion of technical developments and revised and extended coverage provided by broader international authorship Brings together 35 internationally recognized contributors including a number of new contributors *Aquaculture Farming Aquatic Animals and Plants* Third Edition is a recommended text for students of the subject and a concise reference for those working in or entering into the industry      **Current state of fish behaviour & welfare**

**research: Honoring Victoria Braithwaite** Susan Healy,Felicity Ann Huntingford,Becca Franks,2023-04-17      The UFAW Handbook on the Care and Management of Laboratory and Other Research Animals Huw Golledge,Claire

Richardson,2024-05-07 The latest edition of the seminal reference on the care and management of laboratory and research animals The newly revised ninth edition of The UFAW Handbook on the Care and Management of Laboratory and Other Research Animals delivers an up to date and authoritative exploration on worldwide developments current thinking and best practices in the field of laboratory animal welfare science and technology The gold standard in laboratory and captive animal care and management references this latest edition continues the series tradition of excellence by including brand new chapters on ethical review the care of aged animals and fresh guidance on the care of mole rats corvids zebrafish and decapods The book offers introductory chapters covering a variety of areas of laboratory animal use as well as chapters on the management and care of over 30 different taxa of animals commonly utilised in scientific procedures and research around the world It also provides A thorough introduction to the design of animal experiments laboratory animal genetics and the phenotyping of genetically modified mice Comprehensive explorations of animal welfare assessment and the ethical review process Practical discussions of legislation and oversight of the conduct of research using animals from a global perspective In depth examinations of the planning design and construction of efficient animal facilities special housing arrangements and nutrition feeding and animal welfare The UFAW Handbook on the Care and Management of Laboratory and Other Research Animals Ninth Edition is essential for laboratory animal scientists veterinarians animal care staff animal care regulatory authorities legislators and professionals working in animal welfare non governmental organizations

**Current and Future Reproductive Technologies and World Food Production** G. Cliff Lamb,Nicolas DiLorenzo,2013-10-29 This book addresses the impacts of current and future reproductive technologies on our world food production and provides a significant contribution to the importance of research in the area of reproductive physiology that has never been compiled before It would provide a unique opportunity to separate the impacts of how reproductive technologies have affected different species and their contributions to food production Lastly no publication has been compiled that demonstrates the relationship between developments in reproductive management tools and food production that may be used a reference for scientists in addressing future research areas During the past 50 years assisted reproductive technologies have been developed and refined to increase the number and quality of offspring from genetically superior farm animal livestock species Artificial insemination AI estrous synchronization and fixed time AI semen and embryo cryopreservation multiple ovulation and embryo transfer MOET in vitro fertilization sex determination of sperm or embryos and nuclear transfer are technologies that are used to enhance the production efficiency of livestock species **Are We Pushing Animals to Their Biological Limits?** Temple Grandin,Martin Whiting,2018-07-31 Stimulating and thought provoking this important new text looks at the welfare problems and philosophical and ethical issues that are caused by changes made to an animal s telos behaviour and physiology both positive and negative to make them more productive or adapted for human uses These changes may involve selective breeding for production appearance traits or competitive

advantage in sport transgenic animals or the use of pharmaceuticals or hormones to enhance production or performance Changes may impose duties to care for these animals further and more intensely or they may make the animal more robust The book considers a wide range of animals including farm animals companion animals and laboratory animals It reviews the ethics and welfare issues of animals that have been adapted for sport as companions in work as ornaments food sources guarding and a whole host of other human functions This important new book sparks debate and is essential reading for all those involved in animal welfare and ethics including veterinarians animal scientists animal welfare scientists and ethologists

*Aquaponics Food Production Systems* Simon Goddek, Alyssa Joyce, Benz Kotzen, Gavin M. Burnell, 2019-06-21 This open access book written by world experts in aquaponics and related technologies provides the authoritative and comprehensive overview of the key aquaculture and hydroponic and other integrated systems socio economic and environmental aspects Aquaponic systems which combine aquaculture and vegetable food production offer alternative technology solutions for a world that is increasingly under stress through population growth urbanisation water shortages land and soil degradation environmental pollution world hunger and climate change Welfare of production animals: assessment and management of risks Frans J.M. Smulders, Bo Algers, 2023-09-04 This book the fifth in the series Food Safety Assurance and Veterinary Public Health has been conceived by a total of 33 internationally recognised experts from 11 different countries in Europe and from the USA Canada and Australia with backgrounds ranging from veterinary medicine animal science biology and microbiology to psychology philosophy and ethics It provides an up to date overview of the science of animal welfare and its assessment of options for the assessment and management of risks for the welfare of production animals and of the ramifications these may have for the safety of foods of animal origin This volume is targeted at veterinary practitioners official veterinarians in a control function animal and food scientists welfare scientists students in animal welfare auditing and inspection officials and risk managers at all levels of animal production Other publications in the Food Safety Assurance and Veterinary Public Health series are Volume 1 Food safety assurance in the pre harvest phase Volume 2 Safety assurance during food processing Volume 3 Risk management strategies monitoring and surveillance Volume 4 Towards a risk based chain control **The Siberian Sturgeon (*Acipenser baerii*, Brandt, 1869) Volume 2 - Farming** Patrick Williot, Guy Nonnotte, Mikhail Chebanov, 2018-04-09 The Siberian sturgeon *Acipenser baerii* Brandt 1869 is the most widely farmed sturgeon species Continuing from Volume 1 which focuses on the biology of the species the present Volume 2 in turn examines farming aspects It is divided into six parts the first of which deals with reproduction and early ontogenesis i e reproductive cycles controlled reproduction sperm cryoconservation and weaning of larvae The second covers the growing phase with a focus on food and feeding management fish meal replacement potential endocrine disruptions usefulness of prebiotics and immunostimulants and nitrogen excretion Production related data are the focus of the third part and include characteristics countries structures of production evolution in production economic features of the gross production of the

species meat and caviar worldwide a method for assessing the quality of caviars off flavors management and an example of production of fingerlings for restocking Part four addresses selected long term management issues genetic variability of brood stocks genome manipulation and sex control and the advantages of hybrids The next three chapters constitute the fifth part which is devoted to health status immunology and welfare In closing the absence of ecological risks of introducing the species in non native waters is shown using two long term documented examples Russia and France Three methodological chapters round out the volume covering in vitro incubation of ovarian follicles a richly illustrated library of echographies and photos and a detailed presentation of oxygen demand studies

Seafood Supply Chains Miriam Greenwood, 2019-01-16 This book provides a historical and analytical account of changes in the seafood supply chain in Britain from the mid twentieth century to the present looking at the impact of various types of governance The governance of marine fisheries has been a contested issue for decades with increasing anxieties about overfishing In tandem the rise of aquaculture fish and shellfish farming has driven another set of environmental concerns In the food system there have been scandals about safety failures and about fraud At the same time governments issue advice urging people to eat fish for its health benefits In the context of these problems and contradictions how have governments the food industry and ordinary consumers responded The author shows how different types of governance and regulation have been used to seek seafood sustainability and food safety and to communicate nutritional messages to the public and with what effects The book also presents a new model for understanding food chains which combines governance and power approaches with an emphasis on understanding the interests served and the resulting balance of public and private benefits This shows that the role of state regulation should have greater emphasis in governance and agri food analysis and that theories about supply chain functioning including the part played by major retailers and civil society should be modified by a more nuanced understanding of the role of standards and certification systems Although much of the focus is on the UK and Europe this book provides key lessons internationally for the governance of seafood and other agri food supply chains The book will be of interest to students of food policy and those working in the seafood industry or studying for connected qualifications and more widely to readers with an interest in seafood issues and problems

**Sustainable Farmland Management** Robert Fish, 2008 Examining the relationship between sustainability and farmland management in differing temporal spatial and production contexts this book considers farmland multifunctionality systems and systemic thinking debate over information and knowledge and ethical aspects It suggests productive ways of proceeding to enhance integrated thinking on the subject and will be essential reading for researchers and students in agriculture rural studies environmental management geography sociology ecology and conservation

Critical Role of Animal Science Research in Food Security and Sustainability National Research Council, Division on Earth and Life Sciences, Board on Agriculture and Natural Resources, Policy and Global Affairs, Science and Technology for Sustainability Program, Committee on Considerations for the Future of Animal Science



Research,2015-03-31 By 2050 the world's population is projected to grow by one third reaching between 9 and 10 billion. With globalization and expected growth in global affluence a substantial increase in per capita meat, dairy and fish consumption is also anticipated. The demand for calories from animal products will nearly double, highlighting the critical importance of the world's animal agriculture system. Meeting the nutritional needs of this population and its demand for animal products will require a significant investment of resources as well as policy changes that are supportive of agricultural production. Ensuring sustainable agricultural growth will be essential to addressing this global challenge to food security. Critical Role of Animal Science Research in Food Security and Sustainability identifies areas of research and development, technology and resource needs for research in the field of animal agriculture both nationally and internationally. This report assesses the global demand for products of animal origin in 2050 within the framework of ensuring global food security, evaluates how climate change and natural resource constraints may impact the ability to meet future global demand for animal products in sustainable production systems and identifies factors that may impact the ability of the United States to meet demand for animal products including the need for trained human capital, product safety and quality and effective communication and adoption of new knowledge, information and technologies. The agricultural sector worldwide faces numerous daunting challenges that will require innovations, new technologies and new ways of approaching agriculture if the food, feed and fiber needs of the global population are to be met. The recommendations of Critical Role of Animal Science Research in Food Security and Sustainability will inform a new roadmap for animal science research to meet the challenges of sustainable animal production in the 21st century. **Blindness, Light, and the COVID-19 Pandemic** Andres M.

Perez,2021-08-24 *Future Food Systems* Rickey Y. Yada, Rene Van Acker, Martin Scanlon, David Gray,2024-06-13 *Future Food Systems: Exploring Global Production, Processing, Distribution and Consumption* provides an overview of food systems from farming through to logistics, processing, retail service and consumption with the intention of enabling more efficient development of policy and implementation of food related practices. The book presents the considerations which must be understood to develop effective and efficient policies and practices for any level of food system and along the continuum of those systems with attention being given to the academic, public and private sector challenges and opportunities for progress, efficiency, effectiveness and sustainability. Presented in parts to highlight key aspects of the subject area, the book explores production practices including increasingly important programs in integrated farming systems, vertical agriculture and urban farming processes, value adding for commodities, agricultural technology, supply chain innovations and consumer considerations. The book provides foundational insights into the underpinnings of today's food systems, its challenges and its opportunities for the future. Written by industry and academic experts for a balanced perspective. Presents foundational information with practical application insights. Includes chapters on regulatory and policy issues. *Animal Husbandry Regained* John Webster,2013 The farming of animals for meat and milk confronts a stark dilemma. While world demand from

a growing and more affluent human population is increasing rapidly there are strong counter arguments that we should eat less meat and pay more attention to environmental protection animal welfare and human health and well being The aim of this book is to identify and explain the causes and contributors to current problems in animal husbandry especially those related to factory farming and advance arguments that may contribute to its successful re orientation Husbandry is considered in its broadest sense namely the productive and sustainable use of the land for the good of all plants humans and other animals The first part of the book outlines principles and arguments necessary to engage with current problems depletion of natural resources and destruction of environment animal welfare food and health fair trade and sharing resources These arguments are illustrated by examples and sufficient evidence to justify the argument without obscuring the message The second part presents a series of constructive proposals for change and development in animal husbandry both in the developed world and subsistence agriculture These include more integrated crop and livestock farming systems the ethics of animal welfare and environmental management and the evolution of a new social contract whereby the rights of the people to a fair share of good safe food and a green and pleasant land are matched by a shared responsibility to preserve these things

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