

TUMSAT-OACIS Repository - Tokyo

University of Marine Science and Technology

(東京海洋大学)

Frontmatter

メタデータ	言語: eng 出版者: 公開日: 2016-05-13 キーワード (Ja): キーワード (En): 作成者: 青木, 宙 メールアドレス: 所属:
URL	https://oacis.repo.nii.ac.jp/records/1265

CONTENTS

Preface

x

Prevention and Treatment of Diseases Caused By Fish Pathogens 1

Mamoru Yoshimizu, Hisae Kasai, *Laboratory of Biotechnology and Microbiology, Faculty of Fisheries Sciences, Hokkaido University, Hakodate, Hokkaido 041-8611, Japan.*

Takashi Aoki, *Consolidated Research Institute for Advanced Science and Medical Care, Waseda University, 513, Wasedaturumaki-cho, Shinjuku-ku, Tokyo 162-0041, Japan.*[Permanent address: *Faculty of Marine Science, Tokyo University of Marine Science and Technology, Konan 4-5-7, Minato-ku, Tokyo 108-8477, Japan (as an Emeritus Professor)*]

Mitsuru Ototake, *Aquatic Animal Health Division, National Research Institute of Aquaculture, Fisheries Research Agency, Minami-ise, Mie 516-0193, Japan.*

Masahiro Sakai, *Department of Biochemistry and Applied Biosciences, Faculty of Agriculture, University of Miyazaki, 1-1 Gakuen Kibanadai-nishi, Miyazaki 889-2192, Japan*

Tae-Sung Jung, *Aquatic Biotechnology Center of WCU Project, College of Veterinary Medicine, Gyeongsang National University, Jinju, Gyeongnam 660-710, South Korea.*

Jun-ichi Hikima, *Department of Biochemistry and Applied Biosciences, Faculty of Agriculture, University of Miyazaki, 1-1 Gakuen Kibanadai-nishi, Miyazaki 889-2192, Japan*

Nobuaki Okamoto, Takashi Sakamoto, *Faculty of Marine Science, Tokyo University of Marine Science and Technology, Konan 4-5-7, Minato-ku, Tokyo 108-8477, Japan.*

Akiyuki Ozaki, *Aquatic Animal Health Division, National Research Institute of Aquaculture, Fisheries Research Agency, Minami-ise, Mie 516-0193, Japan.*

Ryosuke Yazawa, *Department of Marine Biosciences, Tokyo University of Marine Science and Technology, Konan 4-5-7, Minato-ku, Tokyo 108-8477, Japan.*

1. Prevention and Protection against Infectious Diseases

1.1. Prevention

- 1.1.1. Synopsis
- 1.1.2. Introduction
- 1.1.3. Hygiene and sanitation
- 1.1.4. Disinfection of water supplies and waste water
- 1.1.5. Pathogen-free brood stock
- 1.1.6. Washing and disinfecting eggs before or just after fertilization and eyed stages
- 1.1.7. Monitoring health of hatched fry
- 1.1.8. Temperature control
- 1.1.9. Vaccination
- 1.1.10. Control of normal bacterial flora

1.2. Chemotherapy: Antimicrobial agents for aquaculture in Japan

- 1.2.1. Synopsis
- 1.2.2. Antimicrobial agents and mechanism of antibacterial activity
- 1.2.3. Drug sensitivity test
- 1.2.4. Methods of administration and dynamics of antimicrobial agent
- 1.2.5. Antimicrobial use is allowed against fish bacterial infection in Japan
- 1.2.6. Evils of Aquatic medicine use
- 1.2.7. Appearance of multiple drug resistant strains in fish farms

1.3. Vaccination – Injection, oral and immersion

- 1.3.1. Synopsis
- 1.3.2. Introduction
- 1.3.3. Oral administration
- 1.3.4. Immersion/bath method
- 1.3.5. Injection

1.4. Vaccination – Recombinant and DNA vaccines

- 1.4.1. Synopsis
- 1.4.2. Attenuated vaccine

- 1.4.3. Subunit vaccine (or component vaccine)
- 1.4.4. DNA vaccine
- 1.4.5. Conclusion
- 1.5. Fish Immunostilumants
 - 1.5.1. Synopsis
 - 1.5.2. Introduction
 - 1.5.3. Immunostimulants used in fish and shrimp
 - 1.5.4. Fish defense system enhancement by immunostimulants
 - 1.5.5. Field application for fish immunostimulants
 - 1.5.6. Conclusion
- 2. Diagnosis of Diseases
 - 2.1. Diagnosis -Antiserum Detection
 - 2.1.1. Synopsis
 - 2.1.2. Introduction
 - 2.1.3. Diagnosis
 - 2.1.4. Direct method
 - 2.1.5. Indirect method
 - 2.1.6. Flow cytometry analysis
 - 2.1.7. Virus neutralization test
 - 2.1.8. Enzyme-linked immunosorbent assay (ELISA)
 - 2.1.9. Immunochromatography assay
 - 2.1.10. Development of an Immunochromatography Assay for Fish ISAV
 - 2.2. Diagnosis – PCR detection
 - 2.2.1. Synopsis
 - 2.2.2. Introduction
 - 2.2.3. The basic principles of PCR
 - 2.2.4. Diagnosis of fish bacterial pathogens by PCR
 - 2.2.5. Target genes for PCR-based diagnosis
 - 2.2.6. Conclusion
 - 2.3. Loop mediated isothermal amplification (LAMP) method
 - 2.3.1. Synopsis
 - 2.3.2. Principle of LAMP
 - 2.3.3. Design of primers
 - 2.3.4. Requirements for LAMP reaction
 - 2.3.5. Visualization of amplified products
 - 2.3.6. Application of LAMP for diagnosis of fish pathogens
 - 2.3.7. Bacterial pathogens
 - 2.3.8. Detection of viruses
 - 2.3.9. Parasitic infections
 - 2.3.10. Quantitative LAMP Method
 - 2.3.11. Conclusion
- 3. Selection and Establishment of Disease-Resistant Fish
 - 3.1. Development of Disease-Resistant Fish Using Marker-Assisted Selection
 - 3.1.1. Synopsis
 - 3.1.2. Introduction
 - 3.1.3. Marker-Assisted Selection
 - 3.1.4. Future perspectives
 - 3.2. Establishment of Disease-resistant Fish
 - 3.2.1. Synopsis
 - 3.2.2. Introduction
 - 3.2.3. Transgenesis for disease-resistance
 - 3.2.4. Risks and benefits of transgenic fish

Fish and Shellfish Bio-Defense

84

Teruyuki Nakanishi, *Department of Veterinary Medicine, College of Bioresource Sciences, Nihon University, 1866 Kameino, Fujisawa, Kanagawa 252-0880, Japan.*

Takashi Aoki, *Consolidated Research Institute for Advanced Science and Medical Care, Waseda University, 513, Wasedatsurumaki-cho, Shinjuku-ku, Tokyo 162-0041, Japan.* [Permanent address: *Faculty of Marine Science, Tokyo University of Marine Science and Technology, Konan 4-5-7, Minato-ku, Tokyo 108-8477, Japan (as an Emeritus Professor)*]

Jun-ichi Hikima, *Department of Biochemistry and Applied Biosciences, Faculty of Agriculture, University of Miyazaki, 1-1 Gakuen Kibanadai-nishi, Miyazaki 889-2192, Japan.*

Ikuo Hirono, Sheryll G. Hipolito, *Laboratory of Genome Science, Tokyo University of Marine Science and Technology, Konan 4-5-7, Minato-ku, Tokyo 108-8477, Japan.*

Keisuke G. Takahashi, Makoto Osada, *Laboratory of Aquacultural Biology, Graduate School of Agricultural Science, Tohoku University, Sendai 981-8555, Japan.*

Naoki Itoh, *Graduate School of Agricultural and Life Sciences, The University of Tokyo, Bunkyo, Tokyo 113-8657, Japan*

1. Innate Immunity in Fish
 - 1.1. Synopsis
 - 1.2. First Barrier in Fish, Mucosal Environments
 - 1.3. Humoral Factors in Fish Innate Immunity
 - 1.3.1. Complement System
 - 1.3.2. Lysozyme
 - 1.3.3. Transferrin
 - 1.3.4. Lectin
 - 1.4. Pattern Recognition in Fish
 - 1.4.1. Toll-Like Receptors
 - 1.4.2. Interferon
 - 1.5. Cellular Factors in Fish Innate Immunity
 - 1.5.1. Immune-Related Leukocytes in Fish
 - 1.5.2. Neutrophil, Monocyte and NK Cell in Fish
 - 1.5.3. Phagocytosis
 - 1.6. Conclusion
2. Adaptive Immunity in Fish
 - 2.1. Synopsis
 - 2.2. Cells Involved in Adaptive Immunity
 - 2.3. Molecules Involved in Adaptive Immunity
 - 2.3.1. Immunoglobulins
 - 2.3.2. T-Cell Receptors
 - 2.4. Cell-Mediated Immunity
 - 2.5. Transplantation Immunity
3. Shrimp Bio-Defense
 - 3.1. Synopsis
 - 3.2. Introduction
 - 3.3. Phenol Oxidase
4. Shellfish Bio-Defense
 - 4.1. Synopsis
 - 4.2. Introduction
 - 4.3. Cellular Bio-Defense in Shellfish
 - 4.3.1. Hemocytes
 - 4.3.2. Phagocytosis
 - 4.4. Humoral Bio-Defense in Shellfish
 - 4.4.1. Microbicidal Factors
 - 4.4.2. Self/Non-Self Recognition Molecules

Diseases Caused By Bacterial Pathogens In Inland Water**122**

Hisatsugu Wakabayashi, *Emeritus Professor, the University of Tokyo, 1688 Futatsugi, Matsudo, Chiba 270-0027, Japan*

Terutoyo Yoshida, *Faculty of Agriculture, University of Miyazaki 1-1 Gakuenkibanadai-nishi, Miyazaki 889-2192, Japan*

Tetsuichi Nomura, *Research Fellow of Fisheries Research Agency, Fushiko 14-4-4-3, Higashi-ku, Sapporo, Hokkaido 070-0874, Japan*

Toshihiro Nakai, *Graduate School of Biosphere Science, Hiroshima University, 1-4-4 Kagamiyama, Higashi-Hiroshima 739-8528, Japan*

Tomokazu Takano, *Aquatic Animal Health Division, National Research Institute of Aquaculture, Fisheries Research Agency, Minami-ise, Mie 516-0193, Japan.*

1. Inland water streptococcosis
 - 1.1. Synopsis
 - 1.2. Introduction
 - 1.3. *S. agalactiae* (= *S. diffcilis*), a Disease Agent
 - 1.4. Diagnostic Methods
 - 1.4.1. Serological Classification
 - 1.4.2. Clinical Signs and Pathogenicity
 - 1.4.3. PCR for Identification
 - 1.4.4. Molecular Classification
 - 1.4.5. Genome Analysis
 - 1.5. Control
 - 1.5.1. Vaccine
 - 1.5.2. *Vagococcus Salmoninarum*
 - 1.5.3. Pathogenicity
 - 1.5.4. *L. Piscium*
 - 1.6. Recent Topics
 - 1.6.1. Emerging Streptococcosis
2. Furunculosis
 - 2.1. Synopsis
 - 2.2. Introduction
 - 2.3. Host range
 - 2.4. Disease Agent
 - 2.5. Genome Size
 - 2.6. Serological Classification
 - 2.7. Pathogenesis
 - 2.8. Diagnostic Methods
 - 2.8.1. Clinical Signs
 - 2.8.2. Incubation Period
 - 2.8.3. Histopathology
 - 2.8.4. Definitive Diagnosis
 - 2.9. Serological Identification
 - 2.10. Molecular Identification
 - 2.11. Control
 - 2.12. Prevention
 - 2.13. Vaccine
 - 2.14. Recent topics
3. Bacterial gill disease
 - 3.1. Synopsis
 - 3.2. Introduction
 - 3.3. Disease Agent
 - 3.3.1. *Flabobacterium Branchiophilum*
 - 3.4. Other Bacteria Associated With BGD
 - 3.5. Diagnostic methods
 - 3.6. Control
 - 3.7. Recent Topics

4. Columnaris disease
 - 4.1. Synopsis
 - 4.2. Introduction
 - 4.3. Disease Agent
 - 4.4. Diagnostic Method
 - 4.5. Control
 - 4.6. Recent Topics
5. Bacterial Cold-Water Disease
 - 5.1. Synopsis
 - 5.2. Introduction
 - 5.3. Disease Agent
 - 5.4. Diagnostic Methods
 - 5.5. Control
 - 5.6. Recent Topics
6. Red spot Disease
 - 6.1. Synopsis
 - 6.2. Introduction
 - 6.3. Disease Agent
 - 6.4. Control
7. Edwardsiellosis (*Edwardsiella ictaluri*)
 - 7.1. Synopsis
 - 7.2. Introduction
 - 7.3. Disease Agent
 - 7.3.1. Characteristics
 - 7.3.2. Genome Size
 - 7.3.3. Serological Classification
 - 7.3.4. Molecular Classification
 - 7.3.5. Pathogenesis
 - 7.4. Diagnostic Methods
 - 7.4.1. Clinical Signs and Gross Pathology
 - 7.4.2. Histopathology
 - 7.4.3. Diagnosis by PCR and Serological Techniques
 - 7.5. Control
 - 7.5.1. Prevention
 - 7.5.2. Chemotherapy
 - 7.5.3. Vaccine
 - 7.6. Recent Topics
8. Motile Aeromonads Disease
 - 8.1. Synopsis
 - 8.2. Introduction
 - 8.3. Disease Agent
 - 8.4. Diagnostic Methods
 - 8.5. Control
 - 8.6. Recent Topics

Diseases Caused By Bacterial Pathogens in Saltwater**190**

Yukinori Takahashi, *Department of Applied Aquabiology, National Fisheries University, 2-7-1 Nagata-Honmachi Shimonoseki, Yamaguchi 759-6595, Japan.*

Terutoyo Yoshida, Issei Nishiki, *Department of Aquaculture, Faculty of Agriculture, University of Miyazaki, 1-1 Gakuen Kibanadai-nishi, Miyazaki 889-2192, Japan.*

Masahiro Sakai, *Department of Biochemistry and Applied Biosciences, Faculty of Agriculture, University of Miyazaki, 1-1 Gakuen Kibanadai-nishi, Miyazaki 889-2192, Japan.*

Kim D. Thompson, Alexandra Adams, *Institute of Aquaculture, University of Stirling, Stirling, Stirlingshire, FK9 4LA, Scotland, UK.*

Tae-Sung Jung, *Aquatic Biotechnology Center of WCU Project, College of Veterinary Medicine, Gyeongsang National University, Jinju, Gyeongnam 660-710, South Korea.*

Takashi Aoki, *Consolidated Research Institute for Advanced Science and Medical Care, Waseda University, 513, Wasedatsurumaki-cho, Shinjuku-ku, Tokyo 162-0041, Japan.*

Hisatsugu Wakabayashi, *Emeritus Professor, the University of Tokyo, 1688 Futatsugi, Matsudo, Chiba 270-0027, Japan.*

Jun-ichi Hikima, *Department of Biochemistry and Applied Biosciences, Faculty of Agriculture, University of Miyazaki, Miyazaki, Japan*

Tomokazu Takano, *Aquatic Animal Health Division, National Research Institute of Aquaculture, Fisheries Research Agency, 422-1 Nakatsuhamaura, Minami-ise, Mie 516-0193, Japan.*

Takaji Iida, *Japan Sea National Fisheries Research Institute, Fisheries Research Agency, 422-1 Nakatsuhamaura, Minami-ise, Mie 516-0193, Japan.*

1. Saltwater Streptococcosis
 - 1.1. *Lactococcus garvieae*
 - 1.1.1. Abstract
 - 1.1.2. Introduction
 - 1.1.3. Disease Agent
 - 1.1.4. Diagnostic Methods
 - 1.1.5. Control
 - 1.1.6. Recent Topics
 - 1.2. Fish Pathogenic Lancefield Group C *Streptococcus Dysgalactiae*
 - 1.2.1. Synopsis
 - 1.2.2. Introduction
 - 1.2.3. Disease Agent
 - 1.2.4. Diagnostic Methods
 - 1.2.5. Control
 - 1.3. *Streptococcus Iniae*
 - 1.3.1. Synopsis
 - 1.3.2. Introduction
 - 1.3.3. Disease Agent
 - 1.3.4. Host Range
 - 1.3.5. Diagnostic Methods
 - 1.3.6. Control
 - 1.3.7. Recent Topics
 - 1.4. *Streptococcus Parauberis*
 - 1.4.1. Synopsis
 - 1.4.2. Introduction
 - 1.4.3. Disease agent
 - 1.4.4. Diagnostic Methods
 - 1.4.5. Control
 - 1.4.6. Recent topics
2. Nocardiosis
 - 2.1. Synopsis
 - 2.2. Introduction
 - 2.3. Characteristics of the Disease
 - 2.4. Disease Agent
 - 2.5. Diagnosis
 - 2.6. Control

- 2.7. Conclusion
- 3. Mycobacterial Disease
 - 3.1. Synopsis
 - 3.2. Introduction
 - 3.3. Disease Agent (characteristics, genome size, serological classification, molecular classification, pathogenesis)
 - 3.4. Diagnostic Methods (clinical signs, gross pathology, histopathology, diagnosis: PCR, antibody)
 - 3.5. Control (prevention, chemotherapy, vaccine)
 - 3.6. Recent Topics
- 4. Pasteurellosis
 - 4.1. Synopsis
 - 4.2. Introduction
 - 4.3. Characteristics of the disease agent
 - 4.3.1 Characteristics
 - 4.3.2 Genome size
 - 4.3.3 Serological classification
 - 4.3.4 Molecular classification
 - 4.3.5 Pathogenesis
 - 4.4. Diagnosis
 - 4.4.1 Clinical Signs
 - 4.4.2 Gross pathology
 - 4.4.3 Histopathology
 - 4.5. Diagnostic methods
 - 4.6. Prevention and control
 - 4.6.1 Prevention
 - 4.6.2 Chemotherapy
 - 4.7. Recent Topics
- 5. Vibriosis
 - 5.1. Synopsis
 - 5.2. Introduction
 - 5.3. Disease Agent
 - 5.3.1 Characteristics
 - 5.3.2 Serological Classification
 - 5.3.3 Genome Sequence
 - 5.3.4 Pathogenesis
 - 5.3.5 Virulence Factors and the Coding Genes
 - 5.4. Diagnostic Methods
 - 5.4.1 Clinical and Histopathological Signs
 - 5.4.2 Diagnosis
 - 5.5. Control
- 6. Tenacibaculosis
 - 6.1. Synopsis
 - 6.2. Introduction
 - 6.3. Disease agent
 - 6.4. Diagnostic methods
 - 6.5. Control
 - 6.6. Recent topics (Jellyfish as a vector of *T. maritimum*)
- 7. Edwardsiellosis (Edwardsiella Tarda)
 - 7.1. Synopsis
 - 7.2. Introduction
 - 7.3. Disease Agent
 - 7.3.1 Characteristics
 - 7.3.2 Genome Size
 - 7.3.3 Serological classification
 - 7.3.4 Molecular Classification
 - 7.3.5 Pathogenesis
 - 7.4. Diagnostic Methods
 - 7.4.1 Clinical signs and Gross pathology

- 7.4.2. Histopathology
- 7.4.3. Diagnosis by PCR and Serological Techniques
- 7.5. Control
 - 7.5.1. Prevention
 - 7.5.2. Chemotherapy
 - 7.5.3. Vaccine
- 7.6. Recent Topics
- 8. Bacterial Hemolytic Jaundice
 - 8.1. Synopsis
 - 8.2. Introduction
 - 8.3. Causative Agent
 - 8.4. Diagnostic Methods
 - 8.5. Control
 - 8.6. Recent Topics

Diseases Caused By Viral Pathogens

278

Toshihiro Nakai, *Graduate School of Biosphere Science, Hiroshima University, 1-4-4 Kagamiyama, Higashi-Hiroshima 739-8528, Japan*

Motohiko Sano, *Department of Marine Biosciences, Tokyo University of Marine Science and Technology, Konan 4-5-7, Minato-ku, Tokyo 108-8477, Japan.*

Mamoru Yoshimizu, Hisae Kasai, *Laboratory of Biotechnology and Microbiology, Faculty of Fisheries Sciences, Hokkaido University, Hakodate, Hokkaido 041-8611, Japan*

Toshiaki Itami, *Department of Aquaculture, Faculty of Agriculture, University of Miyazaki, 1-1 Gakuen Kibanadai-nishi, Miyazaki 889-2192, Japan.*

Raja Sudhakaran, *School of Biosciences and Technology, VIT University, Vellore 600 014, Tamilnadu, India*

- 1. Freshwater Fish
 - 1.1. Synopsis/Abstract
 - 1.2. Introduction
 - 1.3. Spring viremia of carp
 - 1.3.1. Introduction
 - 1.3.2. Disease agent
 - 1.3.3. Geographical distribution
 - 1.3.4. Host range
 - 1.3.5. Diagnostic Methods
 - 1.3.6. Control
 - 1.4. Channel catfish virus disease
 - 1.4.1. Introduction
 - 1.4.2. Disease agent
 - 1.4.3. Geographical distribution
 - 1.4.4. Host range
 - 1.4.5. Diagnostic methods
 - 1.4.6. Control
 - 1.5. Koi herpesvirus disease
 - 1.5.1. Introduction
 - 1.5.2. Disease agent
 - 1.5.3. Geographical distribution
 - 1.5.4. Host range
 - 1.5.5. Diagnostic methods
 - 1.5.6. Control
 - 1.6. Herpesviral hematopoietic necrosis
 - 1.6.1. Introduction
 - 1.6.2. Disease agent
 - 1.6.3. Geographical distribution
 - 1.6.4. Host range
 - 1.6.5. Diagnostic methods

- 1.6.5. Control
- 1.7. Epizootic hematopoietic necrosis
 - 1.7.1. Introduction
 - 1.7.2. Disease agent
 - 1.7.3. Geographical distribution
 - 1.7.4. Host Range
 - 1.7.5. Diagnostic methods
 - 1.7.6. Control
- 2. Marine Fish
 - 2.1. Synopsis
 - 2.2. Introduction
 - 2.3. Red sea bream iridoviral disease (RSIVD)
 - 2.4. Viral nervous necrosis (VNN)
- 3. Salmon and Trout Viral Diseases
 - 3.1. Synopsis
 - 3.2. Introduction
 - 3.3. Representative viral diseases and their characteristics
 - 3.3.1. Infectious Pancreatic Necrosis
 - 3.3.2. Infectious Hematopoietic Necrosis
 - 3.3.3. Viral Hemorrhagic Septicemia
 - 3.3.4. Oncorhynchus masou virus disease
 - 3.3.5. Infectious salmon anemia
- 4. Shrimp Diseases
 - 4.1. Synopsis
 - 4.2. Introduction
 - 4.3. Disease Agent (characteristics, genome size, serological classification, molecular classification, pathogenesis)
 - 4.3.1. White spot syndrome
 - 4.3.2. Yellow head disease
 - 4.3.3. Infectious hypodermal and hematopoietic necrosis
 - 4.3.4. Taura syndrome
 - 4.3.5. White tail disease
 - 4.3.6. Infectious myonecrosis
 - 4.4. Diagnostic Methods
 - 4.4.1. White spot syndrome
 - 4.4.2. Yellow head disease
 - 4.4.3. Infectious hypodermal and hematopoietic necrosis
 - 4.4.4. Taura syndrome
 - 4.4.5. White tail disease
 - 4.4.6. Infectious myonecrosis
 - 4.5. Control and Recent Topics (prevention, chemotherapy, vaccine)

Index **323**

About EOLSS **331**