

Contents

About the Symposium

The Lowell Wakefield Symposium Series

Proceedings Acknowledgments

Nomenclature Note

Feeding, Competition, and Predation

The Role of Herring Investigations
in Shaping Fisheries Science

Robert L. Stephenson

Temperature Effects on Zooplankton
Assemblages and Juvenile Herring
Feeding in Prince William Sound, Alaska

Robert J. Foy and Brenda L. Norcross

Is the Production of Coho Salmon in the Strait of
Georgia Linked to the Production of Pacific Herring?

R.J. Beamish, G.A. McFarlane, and J. Schweigert

Common Factors Have Opposite Impacts on
Pacific Herring in Adjacent Ecosystems

G.A. McFarlane, R.J. Beamish, and J. Schweigert

Trophic Position of Pacific Herring in Prince William
Sound, Alaska, Based on Their Stable Isotope Abundance

Thomas C. Kline Jr

Pacific Herring in the Western
Bering Sea Predatory Fish Diet

Alexei M. Orlov and Sergei I. Moiseev

Herring Abundance, Food Supply, and Distribution
in the Barents Sea and Their Availability for Cod

*Emma L. Orlova, Elena I. Seliverstova,
Andrey V. Dolgov, and Valentina N. Nesterova*

Distribution and Feeding Habits of Juvenile
Herring (*Clupea pallasii*) in Northern Japan

Masayoshi Sasaki, Ryotaro Ishida, and Takayanagi Shiro

Predation by Smelt (*Hypomesus japonicus*) on
Herring Larvae (*Clupea pallasii*) in Karagin Bay
Petr M. Vasilets

Estimating Whole Body Energy Content
for Juvenile Pacific Herring from Condition
Factor, Dry Weight, and Carbon/Nitrogen Ratio
A.J. Paul, J.M. Paul, and T.C. Kline

Growth, Reproduction, and Production

Biological Characteristics of Atlantic Herring as
Described by a Long-Term Sampling Program
Michael J. Power and T. Derrick Iles

Is the Decrease in Growth Rate of Atlantic
Herring in the Baltic Sea Density-Dependent?
A Geostatistical Application
M. Cardinale and F. Arrhenius

Growth Pattern of Baltic Herring
in Relation to Spawning Time
Jan Eklund, Marjut Rajasilta, and Päivi Laine

Anatomy of a Strong Year Class: Analysis
of the 1977 Year Class of Pacific Herring
in British Columbia and Alaska
D.E. Hay, M.J. Thompson, and P.B. McCarter

Spawning Bed Selection by Pacific Herring
(*Clupea pallasii*) at Atsuta, Hokkaido, Japan
*Hiroshi Hoshikawa, Ken-ichiro Tajima,
Tadashi Kawai, and Tomohiro Ohtsuki*

Relationship between Date of Hatching and Growth
of Herring Larvae and Juveniles in Ishikari Bay
*Ryotaro Ishida, Masayoshi Sasaki,
Shiro Takayanagi, and Hideo Yoshida*

Decline of the Sakhalin-Hokkaido Herring
Spawning Grounds near the Sakhalin Coast
Elsa R. Ivshina

Norwegian Spring-Spawning Herring

Factors Influencing Location and Time of Spawning in Norwegian Spring-Spawning Herring: An Evaluation of Different Hypotheses

Aril Slotte

Norwegian Spring-Spawning Herring (*Clupea harengus*) and Climate throughout the Twentieth Century

Reidar Toresen and Ole Johan Østvedt

Oocyte Degeneration in Female Recruits of Norwegian Spring-Spawning Herring (*Clupea harengus*)

G.P. Mazhirina and E.I. Seliverstova

The Relevance of a Former Important Spawning Area in the Present Life History and Management of Norwegian Spring-Spawning Herring

Ingolf Røttingen and Aril Slotte

Hydrography and Environmental Impacts

Spawning Stock Fluctuations and Recruitment Variability Related to Temperature for Selected Herring (*Clupea harengus*) Stocks in the North Atlantic

Reidar Toresen

Effect of Herring Egg Distribution and Environmental Factors on Year-Class Strength and Adult Distribution: Preliminary Results from Prince William Sound, Alaska

Evelyn D. Brown and Brenda L. Norcross

Herring Occurrence in the Sound (ICES SD23) in Relation to Hydrographical Features

J. Rasmus Nielsen, Bo Lundgren, Torben F. Jensen, and Karl-Johan Stæhr

The Norwegian Spring-Spawning Herring: Environmental Impact on Recruitment

R. Sætre, R. Toresen, T. Anker-Nilssen, and P. Fossum

Disease and Population Assessment of Pacific Herring in Prince William Sound, Alaska

Terrance J. Quinn II, Gary D. Marty, John Wilcock, and Mark Willette

Stock Assessment

Taking Stock: An Inventory and Review
of World Herring Stocks in 2000

D.E. Hay and others

Survival of Pacific Herring Eggs on
Giant Kelp in San Francisco Bay

Sara Peterson

Seasonal Variation in Herring Target Strength

E. Ona, X. Zha, I. Svellingen, and J.E. Fosseidengen

Estimates of Egg Loss in Pacific Herring Spawning
Beds and Its Impact on Stock Assessments

Jake Schweigert and Carl Haegele

Herring Tilt Angles, Measured through Target Tracking

E. Ona

Latitudinal Difference in Recruitment
Dynamics of Clupeid Fishes: Variable to
the North, Stable to the South

*Yoshiro Watanabe, Norio Shirahuji, and
Masayuki Chimura*

Estimation of First-Year Survival of Pacific Herring
from a Review of Recent Stage-Specific Studies

Brenda L. Norcross and Evelyn D. Brown

Stock Identification, Stock Structure, and Biodiversity

Herring Stock Structure, Stock Discreteness,
and Biodiversity

*R.L. Stephenson, K.J. Clark, M.J. Power,
F.J. Fife, and G.D. Melvin*

Biological Characteristics and Stock Enhancement
of Lake Furen Herring Distributed in Northern Japan

Tokimasa Kobayashi

Morphometric Variation among Spawning Groups
of the Gulf of Maine–Georges Bank Herring Complex

Michael P. Armstrong and Steven X. Cadrin

Contents

Herring of the White Sea

*G.G. Novikov, A.K. Karpov, A.P. Andreeva,
and A.V. Semenova*

A Tagging Experiment on Spring-Spawning Baltic Herring (*Clupea harengus membras*) in Southwest Finland in 1990-1998

*J. Kääriä, M. Naarminen, J. Eklund,
N. Jönsson, G. Aneer, and M. Rajasilta*

Microsatellite Polymorphism and Population Genetic Structure of Atlantic Herring in the Baltic and Adjacent Seas

*Carl André, Fredrik Arrhenius,
Mats Envall, and Per Sundberg*

Microsatellite Population Structure in Herring at Three Spatial Scales

*Arran A. McPherson, Christopher T. Taggart,
Paul W. Shaw, Patrick T. O'Reilly, and Doug Cook*

Intermingling of Herring Stocks in the Barents Sea Area

K.E. Jørstad and others

Gizhiga-Kamchatka Herring Stock Level and Catch Potential

Andrey A. Smirnov

Fishery Management

Management of North Sea Herring and Prospects for the New Millennium

J.H. Nichols

A New Approach to Managing a Herring Fishery: Effort vs. Quota Controls

Denis Tremblay

Industry Acoustic Surveys as the Basis for In-Season Decisions in a Comanagement Regime

*Gary D. Melvin, Robert L. Stephenson,
Mike J. Power, F.J. Fife, and Kirsten J. Clark*

Present State of the Okhotsk Herring Population after Large-Scale Fishery Resumption

V.I. Radchenko and I.V. Melnikov

Baltic Herring Fisheries Management in Estonia:
A Biological, Technical, and Socioeconomic Approach
Tiit Raid and Ahto Järvik

Changing Markets for Alaska Roe Herring
Terry Johnson and Gunnar Knapp

Social and Economic Impacts

Linking Biological and Industrial
Aspects of the Finnish Commercial
Herring Fishery in the Northern Baltic Sea
*Robert Stephenson, Heikki Peltonen, Sakari Kuikka,
Jukka Pönni, Mika Rahikainen, Eero Aro,
and Jari Setälä*

Participants

Index