

1. Record Nr.	UNINA9911019393803321
Titolo	The Atlantic salmon : genetics, conservation and management // edited by Eric Verspoor, Lee Stradmeyer, Jennifer Nielsen
Pubbl/distr/stampa	Oxford ; ; Ames, Iowa, : Blackwell Pub., 2007
ISBN	9786611312121 9781281312129 1281312126 9780470995839 0470995831 9780470995846 047099584X
Descrizione fisica	1 online resource (522 p.)
Altri autori (Persone)	VerspoorEric StradmeyerL NielsenJennifer L
Disciplina	639.9/7756
Soggetti	Salmon stock management Atlantic salmon - Genetics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"SALGEN; Atlantic Salmon Trust."
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	The Atlantic Salmon Genetics, Conservation and Management; Contents; Foreword; Preface; Acknowledgements; Contributors; 1 Introduction; 1.1 Background; 1.2 Genetics,management and conservation; 1.3 Purpose of this book; 1.4 Organisation of this book; 1.5 Summary and conclusions; Part I Background; 2 The Atlantic Salmon; 2.1 Introduction; 2.2 Taxonomy and geographic range; 2.3 Life-history variation; 2.4 Biology of anadromous populations; 2.4.1 Distribution and life in fresh water; 2.4.2 Reproduction; 2.4.3 Egg size, development and survival; 2.4.4 Emergence and dispersal of fry 2.4.5 Free-swimming juvenile life and production2.4.6 Sexual maturation of parr; 2.4.7 Movements of parr; 2.4.8 Smolt migration; 2.4.9 Marine life and distribution; 2.4.10 Homing and return marine migration; 2.5 Biology of non-anadromous populations; 2.5.1 Geographic distribution; 2.5.2 Life history and behaviour; 2.5.3

Maturation and reproduction; 2.6 Summary and conclusions; 3 The Atlantic Salmon Genome; 3.1 DNA; 3.2 Chromatin and chromosomes; 3.2.1 Nature and structure; 3.2.2 Replication, cell division and growth; 3.2.3 Number and ploidy level; 3.3 Genes and genome organisation 3.3.1 Molecular nature and structure 3.3.2 Number and molecular distribution; 3.3.3 Extragenic DNA; 3.4 Genes and development; 3.4.1 Genotypes, alleles and loci; 3.4.2 Genes and traits; 3.4.3 Gene expression; 3.5 Variation among individuals; 3.5.1 Origin; 3.5.2 Scope; 3.5.3 Detection; 3.6 Summary and conclusions; 4 Investigating the Genetics of Populations; 4.1 Overview; 4.2 Population genetics; 4.2.1 Basic concepts; 4.2.2 Models of population structure; 4.2.3 Population differentiation; 4.3 Quantitative genetics; 4.3.1 How it differs from population genetics 4.3.2 Quantitative genetic variation 4.3.3 Genotype by environment interaction; 4.3.4 Integration of molecular and quantitative genetics; 4.4 The genetic characterisation of wild populations; 4.4.1 Allozyme electrophoresis; 4.4.2 Mitochondrial DNA; 4.4.3 Microsatellite DNA; 4.4.4 Other types of molecular marker; 4.5 Studying populations: issues and limitations; 4.5.1 Types of study and their limitations; 4.5.2 Mixed-stock analysis and assignment tests; 4.5.3 Estimating effective population size and detecting population declines; 4.5.4 Parentage assignment; 4.5.5 Relatedness estimation 4.6 Future perspectives: going beyond quantifying genetic differentiation and understanding local adaptation 4.7 Summary and conclusions; Part II Population Genetics; 5 Biodiversity and Population Structure; 5.1 Introduction; 5.2 Evolutionary relatedness to other salmonids; 5.3 Phylogeographic diversity; 5.3.1 Range-wide; 5.3.2 Eastern Atlantic; 5.3.3 Western Atlantic; 5.3.4 Resident (non-anadromous) salmon; 5.3.5 Historical origins; 5.4 Regional and local population structure; 5.4.1 Spatial scale and boundaries; 5.4.2 Metapopulation structure and gene flow; 5.5 Overview 5.6 Summary and conclusions

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## Sommario/riassunto

Atlantic Salmon is a cultural icon throughout its North Atlantic range; it is the focus of probably the World's highest profile recreational fishery and is the basis for one of the World's largest aquaculture industries. Despite this, many wild stocks of salmon are in decline and underpinning this is a dearth of information on the nature and extent of population structuring and adaptive population differentiation, and its implications for species conservation. This important new book will go a long way to rectify this situation by providing a thorough review of the genetics of Atlantic

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