

(Fish Culture, Breeding and Pathology)

Course II: Fish and Fisheries (Applied Ichthyology): (MSZO -607)

UNIT WISE CONTENTS

Block I: General Fishery Management

Unit 1: General fishery resource in India and Uttarakhand

- 1.1 Objectives
- 1.2 Introduction
- 1.3 Resources
 - 1.3.1 Riverine fisheries
 - 1.3.2 Regulation and exploitation
 - 1.3.3 Improvement of fish stocks
 - 1.3.4 River pollution
 - 1.3.5 Dams, their effect on fish migration and remedial measures
- 1.4 Lacustrine fishery: management, development and exploitation
- 1.5 Cold water fishery: management, development and exploitation
- 1.6 Estuarine fisheries: management, development and exploitation
- 1.7 Marine fishery: exploitation of marine fishery resources of India
- 1.8 Summary
- 1.9 Terminal Questions and Answers

Unit 2: Fish growth and Age

- 2.1 Objectives
- 2.2 Introduction
- 2.3 Factors responsible for growth
- 2.4 Age and growth relationship
- 2.5 Natural fish food organism & their role in fish growth: Plankton, Benthos.
- 2.6 Summary
- 2.7 Terminal Questions and Answers

Unit 3: Fish Breeding and Spawning

- 3.1 Objectives
- 3.2 Introduction
- 3.3 Factors responsible for induced breeding
 - 3.3.1 Hypophysation
 - 3.3.2 Use of different synthetic and natural hormones, their formulation and Mechanism of action
- 3.4 Bundh breeding
- 3.5 Hapa breeding
- 3.6 Hatchery management
 - 3.6.1 Flow through hatchery for Mahseer and Trout
 - 3.6.2 Ploidy induction
 - 3.6.3 Production of monosex population
 - 3.6.4 Hybridization
 - 3.6.5 Cryo-preservation of gametes and embryo
 - 3.6.6 Transgenic fish
- 3.7 Summary
- 3.8 Terminal Questions and Answers

Unit 4: Fish culture systems and management

- 3.1 Objectives
- 3.2 Introduction
- 3.3 Ponds and pond ecology
- 3.4 Fish farm: construction and lay out of different types of ponds
- 3.5 Different types of culture system.

- 3.6 Cultivable indigenous & exotic fishes.
- 3.7 Pond management: Water, soil, manuring and liming.
- 3.8 Manuring (organic and inorganic) and liming
- 3.9 Concept of Composite fish farming and polyculture
- 3.10 Summary
- 3.11 Terminal questions and Answers

Unit 5: Inland fishing gears and fishing methods

- 4.1 Objectives
- 4.2 Introduction
- 4.3 Biological factors in fishing
- 4.4 Types of fishing gears
- 4.5 Natural and synthetic fibers
- 4.6 Preparation and maintenance of fishing nets
- 4.7 Different fishing method
- 4.8 Summary
- 4.9 Terminal Questions and Answers

Block II: Aquaculture Practices

Unit 6: Cold water aquaculture and its scope in Uttarakhand

- 5.1 Objectives
- 5.2 Introduction
- 5.3 Scope of aquaculture for sustainable livelihood
- 5.4 Aquaculture of cold water fishes
- 5.5 Polyculture of carps
- 5.6 Sewage feed fisheries
- 5.7 Summary
- 5.8 Terminal Questions and Answers

Unit 7: Exotic fishes and their role in fish farming

- 6.1 Objectives
- 6.2 Introduction
- 6.3 Exotic fishes for aquaculture
- 6.4 Trout farming in uplands and culture of common carp
- 6.5 Summary
- 6.6 Terminal Questions and Answers

Unit 8: Larvivorous fishes and their culture

- 7.1 Objectives
- 7.2 Introduction
- 7.3 Larvivorous fishes
 - 7.3.1 Indigenous
 - 7.3.2 Exotic
 - 7.3.3 Culture of larvivorous fishes
- 7.4 Use of larvivorous fishes for biological control
- 7.5 Summary
- 7.6 Terminal Questions and Answers

Unit 9: Integrated Aquaculture

- 9.1 Objectives
- 9.2 Introduction
- 9.3 Concept of integrated fish farming
- 9.4 Different practices of integrated fish farming
 - 9.4.1 Fish-cum-poultry
 - 9.4.2 Fish-cum-duckery
 - 9.4.3 Fish-cum-piggery
 - 9.4.4 Fish-cum-Horticulture
 - 9.4.5 Paddy-cum-fish culture
 - 9.4.6 Economic and biological importance of integrated fish culture

- 9.5 Summary
- 9.6 Terminal Questions and Answers

Unit 10: Fish nutrition and pathology

- 10.1 Objectives
- 10.2 Introduction
 - 10.2.1 Nutritional requirement of fish
 - 10.2.2 Feed and feed formulation
 - 10.2.3 Different type of feed
 - 10.2.4 Artificial feeding
 - 10.2.5 Feeding devices
- 10.3 Fish diseases and their control
 - 10.3.1 Different fish pathogens: Viral, Bacterial, Fungal and Parasitic
 - 10.3.2 Different fish diseases: Pathogenic, Nutritional, Parasitic and Environmental.
 - 10.3.3 Prophylactic measures to control fish diseases.
 - 10.3.4 Summary
 - 10.3.5 Terminal Questions and Answers

Suggested Readings:

1. Jhingran: Fish and Fisheries of India (1985, Hindustan Publishing Corporation)
2. Khanna and Singh: Textbook of Fish Biology and Fisheries (2003, Narendra Publishing
3. Singh: Advances in Fish Research, Vol. I and II (1993 and 1997, Narendra Publishing House)
4. Srivastava: A Textbook of Fishery Science and Indian Fisheries (1985, Kitab Mahal)
5. Srivastava, Gopalji: Fishes of U.P. and Bihar (2002, Vishwavidyalaya Prakashan)
6. Gupta and Gupta: General and applied Ichthyology (Fish and Fisheries) (2006, Chand)
7. Santhanam: Fisheries Science (1990, Daya Publishing House)
8. Pillay, T. V. R. (1993). *Aquaculture*. Fishing News Books.
9. Srivastava, C. B. L. (1999). *Fish Biology*. Narendra Pub. House.
10. Ayappan,S.(2011):Hand book of fisheries & Aquaculture, ICAR Publication.