

# REPRODUCTION IN VERTEBRATES



## Introduction:

Reproduction is a biological process during which a living organism produces offspring (children). It is a characteristic of all living organisms and Vertebrates are animals having a backbone. A successful reproduction is very important to ensure the continued existence of the species. Different animals use various reproductive strategies to increase their reproductive success in the environment. There are two main types of reproductive strategies, the r-strategy and k-strategy.

### The r-strategy

- Some animals expend more energy in giving birth to many offspring, but spend little time in parental care.
- Many of these offspring will die before the adulthood, but enough number will survive to continue the species.

### The k-strategy

- Some animals expend less energy in giving birth to fewer offspring but spend more time on parental care.
- Many of these offspring will survive to adulthood.

## FERTILISATION

There are two fertilisation strategies, the External and Internal fertilisations.

### The external fertilisation

- The external fertilisation takes place **outside** the female's body.
- It occurs most on the aquatic animals such as fishes and amphibians (animals that lives both on land and water such as frogs).
- Very little behaviour is required between male and female.
- This type of fertilisation requires water for prevent gametes (egg and sperm cell) from drying out.

### The internal fertilisation

- The internal fertilisation takes place **inside** the female's body
- It occurs **mostly** on insects and terrestrial animals such as humans, cow, etc.
- There is large cooperative between male and female.
- This type of fertilisation does not require water

## OVIARY, OVOVIVIPARY AND VIVIPARY

### a Ovipary

Ovipary shows that eggs hatch outside the body. In oviparous animals, the embryo develops in an egg **outside** the female's body.

#### Oviparous aquatic animals

- Fertilisation takes place externally in the water.
- The developing embryo is surrounded and protected by a jelly-like layer.
- Large number of gametes are produced.
- These animals include fishes and amphibians.

#### Oviparous terrestrial animals

- Fertilisation takes place internally.
- The developing embryo is surrounded and protected by shell.
- Fewer number of gametes are produced.
- These animals include birds, mammals and some reptiles.

### b Ovovivipary

Ovovivipary shows that eggs hatch inside the body. In ovovivipary, the embryo develops in an egg **inside** the female's body.

- Internal fertilisation takes place.
- The embryo is surrounded by thin membranous shell inside the female's body.
- Fewer number of gametes are produced.
- These animals include snakes and some sharks.

### c Vivipary

Vivipary shows that the offspring are born alive.

- Internal fertilisation takes place.
- The fertilised egg develop into an embryo without the protection of a shell.
- Fewer number of gametes are produced.
- These animal include most mammals and certain sharks

# Reproduction Of Vertebrates

**David O. Norris**



## **Reproduction Of Vertebrates:**

**The Reproduction of Vertebrates** Richard Sadleir,2012-12-02 The Reproduction of Vertebrates describes the vertebrate reproductive systems in an evolutionary sequence and according to taxonomic classes This book is divided into seven chapters each chapter tackles a specific vertebrate class This text specifically considers fish amphibians reptiles birds mammals and man Discussions in each chapter include these species evolutionary history classification external indications of sex mating fertilization development endocrinology breeding seasons sexual maturation migration response to environmental factors and economic importance The concluding chapter presents the comparative aspects of reproduction of these vertebrates This text is of great value to teachers and students who are interested in the vertebrate reproductive system

**Comparative Vertebrate Reproduction** Julian Lombardi,2012-12-06 Comparative Vertebrate Reproduction is the only comprehensive textbook covering major topics in the reproductive biology of vertebrates from sexuality and gametogenesis to reproductive ecology and life history tactics The work draws heavily on recent reviews and papers while placing topics in a historical context and conceptual framework In addition the author provides detailed comparative surveys of each of the major topics discussed Comparative Vertebrate Reproduction has been written as a textbook for upper level undergraduate and graduate level students in biology zoology physiology animal science and veterinary medicine The work also serves as an excellent reference for researchers in medical and veterinary schools working in reproductive medicine

*Hormones and Reproduction of Vertebrates, Volume 2* David O. Norris,Kristin H. Lopez,2010-11-11 This series of volumes represents a comprehensive and integrated treatment of reproduction in vertebrates from fishes of all sorts through mammals It is designed to provide a readable coordinated description of reproductive basics in each group of vertebrates as well as an introduction to the latest trends in reproductive research and our understanding of reproductive events Whereas each chapter and each volume is intended to stand alone as a review of that topic or vertebrate group respectively the volumes are prepared so as to provide a thorough topical treatment across the vertebrates Terminology has been standardized across the volumes to reduce confusion where multiple names exist in the literature and a comprehensive glossary of these terms and their alternative names is provided A complete essential and up to date reference for research scientists working on vertebrate hormones and reproduction and on animals as models in human reproductive research Covers the endocrinology neuroendocrinology physiology behaviour and anatomy of vertebrate reproduction Structured coverage of the major themes for all five vertebrate groups allows a consistent treatment for all Special chapters elaborate on features specific to individual vertebrate groups and to comparative aspects similarities and differences between them

**Hormones and Reproduction of Vertebrates** David O. Norris,Kristin H. Lopez,2010-11-25 This series of volumes represents a comprehensive and integrated treatment of reproduction in vertebrates from fishes of all sorts through mammals It is designed to provide a readable coordinated description of reproductive basics in each group of vertebrates as

well as an introduction to the latest trends in reproductive research and our understanding of reproductive events Whereas each chapter and each volume is intended to stand alone as a review of that topic or vertebrate group respectively the volumes are prepared so as to provide a thorough topical treatment across the vertebrates Terminology has been standardized across the volumes to reduce confusion where multiple names exist in the literature and a comprehensive glossary of these terms and their alternative names is provided A complete essential and up to date reference for research scientists working on vertebrate hormones and reproduction and on animals as models in human reproductive research Covers the endocrinology neuroendocrinology physiology behaviour and anatomy of vertebrate reproduction Structured coverage of the major themes for all five vertebrate groups allows a consistent treatment for all Special chapters elaborate on features specific to individual vertebrate groups and to comparative aspects similarities and differences between them

*Hormones and Reproduction of Vertebrates: Birds* ,2011      *Hormones and Reproduction of Vertebrates: Mammals* ,2011

*Vertebrate Reproduction* Volker Blüm,2012-12-06 Oral birth in the Australian gastric brooding frog *Rheobatrachus sUus*  
2 Preface I have deliberately chosen the title picture to the preface which shows the oral birth of a young gastric brooding frog *Rheobatrachus situs* to draw the reader's attention to the preface since I wish to explain why the book was written and illustrated in the way it now appears The book has grown out of the material of a lecture course taking 3 to 4 hours per week each semester that I have given for several years at the Ruhr University Bochum as the theoretical basis for an intensive 4 week practical course on vertebrate reproduction for students of biology For various reasons I am a hardened opponent of giving lecture notes to the students On the other hand I found that my students made great efforts to work through and supplement their own lecture notes by studying the literature However there are no suitable textbooks on vertebrate reproduction written in German and the standard work in this field is now several decades old and deals mainly with mammals The students were therefore often frustrated in their efforts given the limited time they had available I have therefore decided to present here the most important structural and functional aspects of vertebrate reproduction and include other material to extend the framework of my original lectures      *Hormones and Reproduction of Vertebrates: Amphibians* ,2011 This series of volumes represents a comprehensive and integrated treatment of reproduction in vertebrates from fishes of all sorts through mammals It is designed to provide a readable coordinated description of reproductive basics in each group of vertebrates as well as an introduction to the latest trends in reproductive research and our understanding of reproductive events Whereas each chapter and each volume is intended to stand alone as a review of that topic or vertebrate group respectively the volumes are prepared so as to provide a thorough topical treatment across the vertebrates Terminology has been standardized across the volumes to reduce confusion where multiple names exist in the literature and a comprehensive glossary of these terms and their alternative names is provided Publisher's description

***Hormones and Reproduction of Vertebrates: Reptiles*** ,2011      *The Development of Sex in Vertebrates* Francis

William Rogers Brambell,1930      **Hormones and Reproduction of Vertebrates, Volume 4** David O. Norris,Kristin H. Lopez,2011-05-04 This series of volumes represents a comprehensive and integrated treatment of reproduction in vertebrates from fishes of all sorts through mammals It is designed to provide a readable coordinated description of reproductive basics in each group of vertebrates as well as an introduction to the latest trends in reproductive research and our understanding of reproductive events Whereas each chapter and each volume is intended to stand alone as a review of that topic or vertebrate group respectively the volumes are prepared so as to provide a thorough topical treatment across the vertebrates Terminology has been standardized across the volumes to reduce confusion where multiple names exist in the literature and a comprehensive glossary of these terms and their alternative names is provided A complete essential and up to date reference for research scientists working on vertebrate hormones and reproduction and on animals as models in human reproductive research Covers the endocrinology neuroendocrinology physiology behaviour and anatomy of vertebrate reproduction Structured coverage of the major themes for all five vertebrate groups allows a consistent treatment for all Special chapters elaborate on features specific to individual vertebrate groups and to comparative aspects similarities and differences between them      *Hormones and Reproduction of Vertebrates, Volume 1* David O. Norris,Kristin H. Lopez,2011-05-04 This series of volumes represents a comprehensive and integrated treatment of reproduction in vertebrates from fishes of all sorts through mammals It is designed to provide a readable coordinated description of reproductive basics in each group of vertebrates as well as an introduction to the latest trends in reproductive research and our understanding of reproductive events Whereas each chapter and each volume is intended to stand alone as a review of that topic or vertebrate group respectively the volumes are prepared so as to provide a thorough topical treatment across the vertebrates Terminology has been standardized across the volumes to reduce confusion where multiple names exist in the literature and a comprehensive glossary of these terms and their alternative names is provided A complete essential and up to date reference for research scientists working on vertebrate hormones and reproduction and on animals as models in human reproductive research Covers the endocrinology neuroendocrinology physiology behaviour and anatomy of vertebrate reproduction Structured coverage of the major themes for all five vertebrate groups allows a consistent treatment for all Special chapters elaborate on features specific to individual vertebrate groups and to comparative aspects similarities and differences between them      *Hormones and Reproduction of Vertebrates, Volume 3* David O. Norris,Kristin H. Lopez,2024-08-05 *Hormones and Reproduction of Vertebrates Volume 3 Reptiles* is the third of five second edition volumes representing a comprehensive and integrated overview of hormones and reproduction in fishes amphibians reptiles birds and mammals The book includes coverage of endocrinology neuroendocrinology physiology behavior and anatomy of reptilian reproduction It provides a broad treatment of the roles of pituitary thyroid adrenal and gonadal hormones in all aspects of reproduction as well as descriptions of major life history events New to this edition is a concluding assessment of the effect

of environmental influences on reptiles Initial chapters in this book broadly examine sex determination reproductive neuroendocrinology stress and hormonal regulation as it relates to testicular and ovarian function Subsequent chapters examine hormones and reproduction of specific taxa including turtles crocodilians lizards and snakes The book concludes with an examination of endocrine disruption of reproduction in reptiles

**Hormones and Reproduction of Vertebrates, Volume 3 Reptiles** is designed to provide a readable coordinated description of reproductive basics in reptiles as well as an introduction to the latest trends in reproductive research and a presentation of our understanding of reproductive events gained over the past decade It may serve as a stand alone reference for researchers and practitioners in the field of herpetology or as one of five coordinated references aligned to provide topical treatment across vertebrate taxa for researchers practitioners and students focused on vertebrate endocrinology Covers endocrinology neuroendocrinology physiology behavior and anatomy of reptile reproduction Includes pituitary thyroid adrenal and gonadal hormones Focuses on turtles crocodilians lizards and snakes Provides new coverage on environmental influences on reptiles

*Hormones and Reproduction of Vertebrates, Volume 5* David O. Norris, Kristin H. Lopez, 2011-05-04 This series of volumes represents a comprehensive and integrated treatment of reproduction in vertebrates from fishes of all sorts through mammals It is designed to provide a readable coordinated description of reproductive basics in each group of vertebrates as well as an introduction to the latest trends in reproductive research and our understanding of reproductive events Whereas each chapter and each volume is intended to stand alone as a review of that topic or vertebrate group respectively the volumes are prepared so as to provide a thorough topical treatment across the vertebrates Terminology has been standardized across the volumes to reduce confusion where multiple names exist in the literature and a comprehensive glossary of these terms and their alternative names is provided A complete essential and up to date reference for research scientists working on vertebrate hormones and reproduction and on animals as models in human reproductive research Covers the endocrinology neuroendocrinology physiology behaviour and anatomy of vertebrate reproduction Structured coverage of the major themes for all five vertebrate groups allows a consistent treatment for all Special chapters elaborate on features specific to individual vertebrate groups and to comparative aspects similarities and differences between them

**Hormones and Reproduction of Vertebrates, Volume 2** David O. Norris, Kristin H Lopez, PhD, 2010-10-08 This series of volumes represents a comprehensive and integrated treatment of reproduction in vertebrates from fishes of all sorts through mammals It is designed to provide a readable coordinated description of reproductive basics in each group of vertebrates as well as an introduction to the latest trends in reproductive research and our understanding of reproductive events Whereas each chapter and each volume is intended to stand alone as a review of that topic or vertebrate group respectively the volumes are prepared so as to provide a thorough topical treatment across the vertebrates Terminology has been standardized across the volumes to reduce confusion where multiple names exist in the literature and a comprehensive glossary of these terms and

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Vertebrate Embryology John Wilfrid Jenkinson, 1925

**Hormones and Reproduction of Vertebrates, Volume 5** David O. Norris, Kristin H. Lopez, 2024-08-08 Hormones and Reproduction of Vertebrates Volume 5 Mammals is the fifth of five second edition volumes representing a comprehensive and integrated overview of hormones and reproduction in fishes amphibians reptiles birds and mammals The book includes coverage of endocrinology neuroendocrinology physiology behavior and anatomy of reptilian reproduction It provides a broad treatment of the roles of pituitary thyroid adrenal and gonadal hormones in all aspects of reproduction as well as descriptions of major life history events New to this edition is a concluding assessment of the effect of environmental influences on mammals Initial chapters in this book broadly examine sex determination reproductive neuroendocrinology stress and hormonal regulation as it relates to male and female reproductive structure and function Subsequent chapters introduce the evolution of viviparity and examine pregnancy in eutherian mammals parturition pheromones and behavioral neuroendocrinology Covered taxa include rodents bats and primates The book concludes with an examination of the environmental influences on hormones and reproduction of mammals including endocrine disrupting chemicals and climate change

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