

DEVELOPMENTS IN HYDROBIOLOGY

Reproductive Strategies and Developmental Patterns in Annelids

edited by

Adriaan W.C. Dorrestein and Wilfried Westheide



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Reproductive Strategies And Developmental Patterns In Annelids

**J. Wolfgang Wägele, Thomas
Bartolomaeus**



Reproductive Strategies And Developmental Patterns In Annelids:

Reproductive Strategies and Developmental Patterns in Annelids Adriaan W.C. Dorresteyn, Wilfried Westheide, 1999-12-31 The fascination of the Annelida to scientists lies in the beauty of their structures and the functionality of their body plan the tremendous adaptive radiation which has made it possible for these animals to colonize almost all marine limnic and terrestrial biotopes In doing so they have evolved a great variety of life forms and their reproduction and development are correspondingly diverse with many modes and patterns unique in the animal kingdom In this special volume recent progress in this broad research area is presented by 26 specialists in general through surveys or treatments of selected examples Some of them review important annelid taxa such as the Nereididae Syllidae Spionidae Cirratulidae Clitellata and Pogonophora others analyse reproductive and developmental structures and phenomena in annelids e g segmental organs sex pheromones oogenesis mating systems sperm types life cycles larval settlement cleavage and symmetry of embryos or discuss controversial approaches to annelid systematics The book will be of interest to all zoologists who work with annelids as well as to embryologists and other researchers in reproductive biology

Reproductive Strategies and Developmental Patterns in Annelids Adriaan W.C. Dorresteyn, Wilfried Westheide, 2013-04-18 The fascination of the Annelida to scientists lies in the beauty of their structures and the functionality of their body plan the tremendous adaptive radiation which has made it possible for these animals to colonize almost all marine limnic and terrestrial biotopes In doing so they have evolved a great variety of life forms and their reproduction and development are correspondingly diverse with many modes and patterns unique in the animal kingdom In this special volume recent progress in this broad research area is presented by 26 specialists in general through surveys or treatments of selected examples Some of them review important annelid taxa such as the Nereididae Syllidae Spionidae Cirratulidae Clitellata and Pogonophora others analyse reproductive and developmental structures and phenomena in annelids e g segmental organs sex pheromones oogenesis mating systems sperm types life cycles larval settlement cleavage and symmetry of embryos or discuss controversial approaches to annelid systematics The book will be of interest to all zoologists who work with annelids as well as to embryologists and other researchers in reproductive biology

Annelids in Modern Biology Daniel H. Shain, 2009-04-22 Annelids offer a diversity of experimentally accessible features making them a rich experimental subject across the biological sciences including evolutionary development neurosciences and stem cell research This volume introduces the Annelids and their utility in evolutionary developmental biology neurobiology and environmental ecological studies including extreme environments The book demonstrates the variety of fields in which Annelids are already proving to be a useful experimental system Describing the utility of Annelids as a research model this book is an invaluable resource for all researchers in the field

Systematics and Diversity of Annelids Maria Capa, Pat Hutchings, 2021-08-18 In this Special Issue we address the state of the art of the systematics of the main annelid groups and the improvements in the

diversity they hold with special emphasis on the latest discoveries in well studied areas expeditions to unsurveyed areas or environments or the use of novel techniques that allow for the improvement of biodiversity knowledge We are hoping that this Special Issue will provide a platform facilitating a review of current knowledge on the subject identifying current research problems as well as indicating directions and research trends for the future

Handbook of Marine Model Organisms in Experimental Biology Agnes Boutet, Bernd Schierwater, 2021-12-13 The importance of molecular approaches for comparative biology and the rapid development of new molecular tools is unprecedented The extraordinary molecular progress belies the need for understanding the development and basic biology of whole organisms Vigorous international efforts to train the next generation of experimental biologists must combine both levels next generation molecular approaches and traditional organismal biology This book provides cutting edge chapters regarding the growing list of marine model organisms Access to and practical advice on these model organisms have become a *conditio sine qua non* for a modern education of advanced undergraduate students graduate students and postdocs working on marine model systems Model organisms are not only tools they are also bridges between fields from behavior development and physiology to functional genomics Key Features Offers deep insights into cutting edge model system science Provides in depth overviews of all prominent marine model organisms Illustrates challenging experimental approaches to model system research Serves as a reference book also for next generation functional genomics applications Fills an urgent need for students Related Titles Jarret R L K McCluskey eds The Biological Resources of Model Organisms ISBN 978 1 1382 9461 5 Kim S K Healthcare Using Marine Organisms ISBN 978 1 1382 9538 4 Mudher A T Newman eds Drosophila A Toolbox for the Study of Neurodegenerative Disease ISBN 978 0 4154 1185 1 Green S L The Laboratory Xenopus sp ISBN 978 1 4200 9109 0

Marine Ornamental Species Aquaculture Ricardo Calado, Ike Olivotto, Miquel Planas Oliver, G. Joan Holt, 2017-03-06 The global trade of aquatic organisms for home and public aquariums along with associated equipment and accessories has become a multi billion dollar industry Aquaculture of marine ornamental species still in its infancy is recognized as a viable alternative to wild collection as it can supplement or replace the supply of wild caught specimens and potentially help recover natural populations through restocking This book collects into a single work the most up to date information currently available on the aquaculture of marine ornamental species It includes the contributions of more than 50 leading scientists and experts on different topics relevant for the aquaculture of the most emblematic groups of organisms traded for reef aquariums From clownfish to angelfish tangs and seahorses as well as corals anemones shrimps giant clams and several other reef organisms all issues related with the husbandry breeding and trade are addressed with explanatory schemes and illustrations being used to help in understanding the most complex topics addressed Marine Ornamental Species Aquaculture is a key reference for scientists and academics in research institutes and universities public and private aquaria as well as for hobbyists Entrepreneurs will also find this book an important resource as the culture of marine ornamental species is

analyzed from a business oriented perspective highlighting the risks and opportunities of commercial scale aquaculture of marine ornamentals Pleistoannelida, Sedentaria II Günter Purschke, Markus Böggemann, Andreas Schmidt-Rhaesa, Wilfried Westheide, 2020-02-24 This book is the second volume in a series of 4 volumes in the Handbook of Zoology series treating morphology anatomy reproduction development ecology phylogeny systematics and taxonomy of polychaetous Annelida In this volume a comprehensive review of a few more derived higher taxa within Sedentaria are given namely Sabellida Opheliida Capitellida as well as Hrabieiellidae The former comprise annelids possessing a body divided into two more or less distinct regions or tagmata called thorax and abdomen Here two groups of families are united the spioniform and sabelliform polychaetes Especially Spionidae and Sabellidae are speciose families within this group and represent two of the largest annelid families These animals live in various types of burrows or tubes and all possess so called feeding palps In one group these appendages are differentiated as grooved feeding palps whereas in the other they may form highly elaborated circular tentacular crowns comprising a number of radioles mostly giving off numerous filamentous pinnulae Often additionally colourful the latter are also received the common names feather duster worms flowers of the sea Christmas tree worms Opheliida Capitellida including five families of truly worm like annelids without appendages represents the contrary Their members burrow in soft bottom substrates and may be classified as non selective deposit feeders Molecular phylogenetic analyses have shown that Echiura or spoon worms formerly regarded to represent a separate phylum are members of this group Last not least Hrabieiellidae is one out of only two families of oligochaete like terrestrial polychaetes and for this reason received strong scientific interest Annelida Basal Groups and Pleistoannelida, Sedentaria I Günter Purschke, Markus Böggemann, Andreas Schmidt-Rhaesa, Wilfried Westheide, 2019-03-18 This book is the first in a series of 4 volumes in the Handbook of Zoology series about morphology anatomy reproduction development ecology phylogeny and systematics of Annelida This first volume covers members of the so called basal radiation and the first part of Sedentaria It is supplemented by chapters on the history of annelid research their fossil record and an introduction to the phylogeny of annelids and their position in the tree of life In the latter chapter the history of their systematic is reviewed giving an almost complete picture of systematic scientific progress especially in the past years which changed our view on annelid phylogeny dramatically The most basal annelids lately united as Palaeoannelida represent two families of aberrant polychaetes formerly often suggested to be highly derived which now give us a fresh look on how the ancestral annelid may have looked like These lack certain key characters such as nuchal organs and possess rather simple nervous systems which now likely represent primitive character states In this basal radiation the first taxon of apparently unsegmented and achaetigerous animals is positioned the Sipuncula Most likely another group of platyhelminth like and unsegmented and even chaeta less annelids Lobatocerebridae falls into this basal radiation The section of Sedentaria starts with Orbiniida a taxon characterized by elongated thread like worms which do not have anterior appendages like palps and comprises several

families representing members of the Mei fauna. These minute worms often inhabiting the interstitial spaces in marine sands are suggested to have evolved by progenesis. The second higher taxon is represented by Cirratuliformia comprising nine families of typical sedentary polychaetes each of which showing a remarkable variation of the annelid body plan. Members of this taxon usually exhibit many annelid characters but certain also lack the most typical prostomial appendages the palps.

Emerging Model Systems in Developmental Biology, 2022-03-23 An ever growing roster of model organisms is a hallmark of 21st century Developmental Biology. Emerging model organisms are well suited to asking some fascinating and important questions that cannot be addressed using established model systems. And new methods are increasingly facilitating the adoption of new research organisms in laboratories. This volume is written by some of the scientists who have played pivotal roles in developing new models or in significantly advancing tools in emerging systems. Presents some of the most interesting additions to the core set of model organisms. Contains contributions from people who have developed new model systems or advanced tools. Includes personal stories about how and why model systems were developed. **Deep Metazoan**

Phylogeny: The Backbone of the Tree of Life J. Wolfgang Wägele, Thomas Bartolomaeus, 2014-08-22 The growing success of molecular methods has challenged traditional views of animal evolution and a large number of alternative hypotheses are hotly debated today. For the deep metazoan phylogeny project data sets of hitherto unmatched quality and quantity were compiled and analysed with innovative bioinformatics tools. The book begins at the base of the tree of life to discuss the origin of animals and early branches of the phylogenetic tree. The following section presents special data sets gained from mitochondrial genomes and from morphology with a focus on nervous systems. The final section is dedicated to theoretical aspects of data analysis and new bioinformatics tools. The book closes with a unique general discussion of all hypotheses contained in previous chapters. This work provides the most comprehensive overview available of the state of the art in this exciting field of evolutionary research. **Elements of Marine Ecology** Frances Dipper, 2022-02-16

Elements of Marine Ecology Fifth Edition focuses on marine ecology as a coherent science providing undergraduate students with an essential foundation of knowledge in the structure and functioning of marine ecosystems. The text reflects ecological groupings such as the pelagic lifestyle vs the benthic lifestyle. In addition background oceanographic material previously in various chapters is consolidated in the first chapter. The broad definition of ecology is the study of organisms in relation to their surroundings. This book presents marine ecology as a coherent science providing undergraduate students with an essential foundation of knowledge in the structure and functioning of marine ecosystems. This new edition has been thoroughly revised and updated to meet the needs of today's courses and now includes worldwide examples all thoroughly updated with brand new chapters. Presents marine ecology as a coherent science providing undergraduate students with an essential foundation of knowledge on the structure and functioning of marine ecosystems. Includes fully updated color images to enhance the text. Provides a new chapter on Marine Nekton to increase coverage of habitat and ecology of water column organisms. Reproductive

Biology and Phylogeny of Annelida Barrie G M Jamieson, Greg Rouse, Fredrik Pleijel, 2006-01-03 Annelida is a diverse group of animals commonly referred to as segmented worms and currently comprising around 14000 described species Found in most marine and freshwater areas annelids have also successfully occupied many subterranean habitats This volume documents annelid reproduction in the context of their phylogenetic relationships It pre *Morphology, Molecules, Evolution and Phylogeny in Polychaeta and Related Taxa* Universität Osnabrück, Günter Purschke, 2006-03-30 Recently evidence has been accumulated which shows that some of the groups formerly regarded as independent phyla such as Pogonophora now recognized as Siboglinidae Echiura Myzostomida and perhaps Sipuncula are most probably nothing else than greatly modified Annelida The extreme morphological diversity found especially in Polychaeta displays the plasticity of a simple segmented organisation that basically is nothing else but a serial repetition of identical units Thus annelids are highly important to our understanding of fundamental questions about morphological and adaptive diversity as well as clarifying evolutionary changes and phylogenetic relationships The book aims to summarize our knowledge on Polychaetes polychaetes and their allies and gives an overview of recent advances gained by studies that employed conventional and modern methods plus increasingly and importantly the use of molecular markers and computer assisted kinship analyses It also reflects the state of art in polychaete sciences and presents new questions and controversies As such it will significantly influence the direction of research on Polychaeta and their related taxa **Coastal Plankton** Otto Larink, Wilfried Westheide, 2006 Each glance into a marine plankton sample is a look into a fantastic world for anyone who wants to study protists and invertebrate animals Nowhere is it possible to observe with a simple device such a variety of forms and taxa developmental stages and adaptations as in a Petri dish with a small plankton sample placed under a light microscope This book with more than 600 micro and 40 macrophotographs on 60 colour plates is an introduction to the most important and most common taxa present in the plankton and it allows the identification even of numerous common species 117 micrographs demonstrate characteristic forms of the phytoplankton 70 of protozoans more than 300 show larvae and other developmental stages and about 90 show holoplanktonic adults of the zooplankton The comprehensively annotated pictures are taken from living organisms during marine excursions mainly from the North Sea coastal area but also from other European coastlines including the western Mediterranean The book therefore is excellently suited to be used in such university courses for students of zoology and marine biology as well as for their teachers but it is certainly also a comprehensible guide for any amateur microscopist and interested layperson *Psammonalia*, 1999 **American Book Publishing Record** R.R. Bowker Company, 1978 **A Photographic Atlas of Marine Biology** Gary D. Wisheart, Erin C. Rempala, Michael J. Leboffe, 2012-01-01 A Photographic Atlas of Marine Biology is a full color supplement that provides photographs of preserved specimens and images taken at various aquaria to provide coverage of organisms in the world s oceans It is designed to accompany any marine biology text or laboratory manual Oceanography And Marine Biology R. N. Gibson, Margaret

Barnes,1997-12-19 The series is an essential reference text for research workers and students in all fields of marine science and related subjects An ever increasing interest in oceanography and environmental issues makes it especially relevant

Atlas of Marine Invertebrate Larvae Michael J. Boyle,Craig M. Young,Mary A. Sewell,2025-04-16 Atlas of Marine Invertebrate Larvae Second Edition covers the origins and history of marine larval science contemporary state of the art approaches to larval development and biology and the highest quality images and schematics showing the broadest diversity of marine larvae in the animal tree of life This book illustrates larval body plans the anatomy of their organ systems muscular sensory digestive including distinct ciliation patterns that facilitate swimming and the complex metamorphic changes they undergo between different larval and growth stages Each chapter contains in text references that direct readers to both historical and contemporary research on the forms functions behaviors and biogeographical distributions of marine larvae This book is a valuable and foundational resource for biologists across various disciplines including biodiversity biogeography and developmental biology Ecologists taxonomists oceanographers and environmental scientists also benefit from the complete coverage of marine larval forms offered by this book Additionally the broad scope and phyletic coverage of marine biodiversity presented in this atlas is ideal for students in oceanography and marine biology animal development biological oceanography and invertebrate zoology Covers every major marine invertebrate clade within the Metazoa Includes an expanded introductory chapter on the biology ecology and roles of larvae in marine food webs and the movements of marine invertebrate species within the world s oceans Provides complete updates to each chapter including condensed comparative background information on taxon specific development and life history patterns Features detailed anatomical schematics and drawings accompanied by compound confocal and scanning electron micrographs for multiple recognized clades within each phylum

Evolutionary Developmental Biology of Invertebrates 2 Andreas Wanninger,2015-08-10 This multi author six volume work summarizes our current knowledge on the developmental biology of all major invertebrate animal phyla The main aspects of cleavage embryogenesis organogenesis and gene expression are discussed in an evolutionary framework Each chapter presents an in depth yet concise overview of both classical and recent literature supplemented by numerous color illustrations and micrographs of a given animal group The largely taxon based chapters are supplemented by essays on topical aspects relevant to modern day EvoDevo research such as regeneration embryos in the fossil record homology in the age of genomics and the role of EvoDevo in the context of reconstructing evolutionary and phylogenetic scenarios A list of open questions at the end of each chapter may serve as a source of inspiration for the next generation of EvoDevo scientists Evolutionary Developmental Biology of Invertebrates is a must have for any scientist teacher or student interested in developmental and evolutionary biology as well as in general invertebrate zoology This volume covers the animals that have a ciliated larva in their lifecycle often grouped together as the Lophotrochozoa as well as the Gnathifera and the Gastrotricha The interrelationships of these taxa are poorly resolved and a broadly accepted clade defining autapomorphy has yet to be

defined Spiral cleavage is sometimes assumed to be the ancestral mode of cleavage of this grouping and therefore the clade is referred to as Spiralia by some authors although others prefer to extend the term Lophotrochozoa to this entire assemblage. Aside from the taxon based chapters this volume includes a chapter that highlights similarities and differences in the processes that underlie regeneration and ontogeny using the Platyhelminthes as a case study.

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