

DEVELOPMENTS IN HYDROBIOLOGY

Morphology, Molecules, Evolution and Phylogeny in Polychaeta and Related Taxa

edited by

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Morphology Molecules Evolution And Phylogeny In Polychaeta And Related Taxa

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Morphology Molecules Evolution And Phylogeny In Polychaeta And Related Taxa:

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 **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 **Pleistoannelida, Errantia II** Günter Purschke, Markus Böggemann, Wilfried Westheide, 2022-01-19 This book is the fourth in a series of 4 volumes in the Handbook of Zoology series about morphology anatomy reproduction development ecology phylogeny and

systematics of Annelida It covers the most typical polychaetes Phyllodocida together with certain smaller taxa placed incertae sedis This volume completes the polychaetous Annelida Phyllodocida are often vagile possess well developed parapodia Due to their broad and flat cirri these parapodia look like leaves in some taxa and leading to the name of the entire group Many of its members are macrophagous and often predators Accordingly most species possess elaborate sense structures such as sensory palps antennae eyes and nuchal organs In certain species the eyes comprise thousands of photoreceptor cells and lenses most likely allowing forming true images Phyllodocida typically possess an axial muscular pharynx called proboscis functioning as a kind of suction pipe allowing them to swallow and ingest their prey or other food This pharynx may be armed with cuticular jaws and some species even possess venom glands The probably most popular and important polychaete model organism *Platynereis dumerilii* belongs to this interesting group Phyllodocida fall into two to three higher clades comprising about 25 families which represent more than one fourth of the polychaete diversity One of these families Syllidae comprises about 700 valid species of mainly small size and may therefore represent one of the most complex and somehow difficult polychaete families on Earth *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 Structure and Evolution of Invertebrate Nervous Systems Andreas Schmidt-Rhaesa, Steffen Harzsch, Günter Purschke, 2015-12-17 The nervous system is particularly fascinating for many biologists because it controls animal characteristics such as movement behavior and coordinated thinking Invertebrate neurobiology has traditionally been studied in specific model organisms whilst knowledge

of the broad diversity of nervous system architecture and its evolution among metazoan animals has received less attention. This is the first major reference work in the field for 50 years bringing together many leading evolutionary neurobiologists to review the most recent research on the structure of invertebrate nervous systems and provide a comprehensive and authoritative overview for a new generation of researchers. Presented in full colour throughout, *Structure and Evolution of Invertebrate Nervous Systems* synthesizes and illustrates the numerous new findings that have been made possible with light and electron microscopy. These include the recent introduction of new molecular and optical techniques such as immunohistochemical staining of neuron specific antigens and fluorescence in situ hybridization combined with visualization by confocal laser scanning microscopy. New approaches to analysing the structure of the nervous system are also included such as micro computational tomography, cryo soft X ray tomography and various 3 D visualization techniques. The book follows a systematic and phylogenetic structure covering a broad range of taxa interspersed with chapters focusing on selected topics in nervous system functioning which are presented as research highlights and perspectives. This comprehensive reference work will be an essential companion for graduate students and researchers alike in the fields of metazoan neurobiology, morphology, zoology, phylogeny and evolution.

Deep Metazoan Phylogeny: The Backbone of the Tree of Life J. Wolfgang Wägele, Thomas Bartolomaeus, 2014-02-27. 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.

Pleistoannelida, Sedentaria III and Errantia I Günter Purschke, Markus Böggemann, Andreas Schmidt-Rhaesa, Wilfried Westheide, 2020-11-23. This book is the third 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. It is devoted to the remaining Sedentaria and the first branches of Errantia. These sedentary polychaetes are Terebellida and Arenicolida, all of which are tube dwelling and deposit feeders. The tubes may be simple burrows stabilized by mucus or the tubes are highly sophisticated, often really aesthetic structures built up of sediment grains glued together by their secretion. Although the former possess anterior appendages used for collecting food particles, these are likely not modified palps rather than a new acquisition. Many of these species are adapted to occur within environments characterized by low oxygen supply and so many members of these taxa possess elaborated branchiae usually

positioned on a number of anterior body segments except for Maldanidae which look like bamboo sticks and thus earned their common name bamboo worms. Members of Arenicolida and Maldanida may occur in high abundance and as such they create biogenically graded sediment beds. The Errantia part starts with Myzostomida a group of symbiotic animals associated with echinoderms which have been variously placed within the tree of life. As such they show numerous adaptations to this specific mode of life. The next group discussed within Errantia is Protodrilida a taxon comprising four families of the former archiannelids which belong to the interstitial fauna. Most likely they evolved by miniaturization from larger ancestors. In contrast to typical errants they do not possess well developed parapodia and antennae. This taxon is followed by Eunicida characterized by possession of a specific jaw apparatus situated ventrally in the foregut and associated with specific musculature. Also being a species rich group showing various feeding modes, some of the smallest and the largest members belong to this taxon.

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.

The Evolution of Organ Systems Andreas Schmidt-Rhaesa, 2007-08-30. Systematics has developed rapidly during the past two decades. A multitude of new methods and contributions from a diversity of biological fields including molecular genetics and developmental biology have provided a wealth of phylogenetic hypotheses, some confirming traditional views, others contradicting them. Despite such inconsistencies it is now possible to recognize robust regions of a tree of life and also to identify problematic areas which have yet to be resolved. This is the first book to apply the current state of phylogeny to an evolutionary interpretation of animal organ systems and body architecture, providing alternative theories in those cases of continuing controversy. Organs do not appear suddenly during evolution; instead they are composed of far simpler structures. In some cases it is even possible to trace particular molecules or physiological pathways as far back as pre-animal history. What emerges is a fascinating picture showing how animals have combined ancestral and new elements in novel ways to form constantly changing responses to environmental requirements. *The Evolution of Organ Systems* starts with a general overview of current animal phylogeny followed by review of general body organization including symmetry, anteroposterior axis, dorsoventral axis, germ layers, segmentation and skeletons. Subsequent chapters then provide a detailed description of the individual organ systems themselves: integument, musculature, nervous system, sensory organs, body cavities, excretory system, circulatory system, respiratory system, intestinal system, gonads and gametes. Generously illustrated throughout, this accessible text is suitable for both upper level undergraduate and graduate students taking courses in animal evolution, organogenesis, animal anatomy.

zoology and systematics It will also be a valuable reference tool for those professional researchers in these fields requiring an authoritative balanced and up to date overview of the topic

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 Meiofauna 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

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

Brazilian Sandy Beaches Antonia Cecilia Zacagnini Amaral, Helio Herminio Checon, Guilherme Nascimento Corte, 2023-09-26 More than 4000 beaches distributed along the Brazilian coastline are one of the country's main assets They harbor endemic and diverse biota and provide numerous goods and services essential to human populations However they are under increasing pressure trapped between the impacts of climate change and human activities in the terrestrial and marine environment and the knowledge about their environmental characteristics and biodiversity is still insufficient to ensure their preservation This book is the first ever comprehensive work about Brazil's sandy beaches addressing their physical ecological and social aspects It was written by an interdisciplinary group of leading Brazilian researchers from different regions of the country and also had the contribution of a few international experts The information synthesized in this book is accessible to anyone who wants to know more about Brazilian coastal biodiversity and represents a significant step towards conserving Brazilian sandy beaches their biodiversity and ecosystem services

Meiobenthology Olav Giere, 2008-11-01 Meiobenthology is the science of the tiny animals that live in huge numbers in all aquatic sediments This fully revised and enlarged second edition emphasizes new discoveries and developments in this field Major progress has been made in three general areas Systematics diversity and distribution Ecology food webs and energy flow Environmental aspects including studies of anthropogenic impacts The meiobenthos of polar and tropical regions deep sea bottoms and hydrothermal vents are now studied in more detail The high number of species found to survive under such extreme conditions puts them at the forefront of biodiversity studies Molecular screening methods enable large numbers to be analyzed upon applying reasonable effort The aim of this book is to synthesize these modern scientific achievements such that meiobenthology can play a key role in aquatic research and in assessing the health of our environment

Virus Infection and Tumorigenesis Xiaobo Zhang, 2019-05-14 This book reviews the latest research on the molecules and mechanisms of marine host stress responses to viral infections and tumorigenesis It offers an overview of the state of the art in the field as well as future directions Metabolism disorder is a characteristic of tumorigenesis Since viruses complete their

life cycle in host cells such infections cause metabolic disorders in the host As such the mechanisms of virus pathogenesis and tumor progression are similar or even identical In essence the role of antiviral molecules is to maintain the metabolic homeostasis of infected host cells and the antiviral molecules induced by virus infection may play an important role in antitumor pathways resulting in cancer cell death or restoring the disordered metabolism of cancer cells The molecules generated during host stress responses to viruses can also contribute to the antitumor mechanisms in humans However the relationship between host stress responses to virus infection and tumorigenesis has not been extensively explored In recent years studies have shown that marine host stress responses to viral invasion can be good models for exploring human antitumor mechanisms Stimulating further research in the field this book offers graduate students and researchers with comprehensive insights into host stress responses to viral invasion and tumor progression It is also a valuable resource for those working in the pharmaceutical industry interested in drug discovery based on molecules derived from host stress responses to viral infection

Osmotic and Ionic Regulation David H. Evans, 2008-11-18 In the 40 years since the classic review of osmotic and ionic regulation written by Potts and Parry there has been astonishing growth in scientific productivity a marked shift in the direction and taxonomic distribution of research and amazing changes in the technology of scientific research It is indicative of the growth of the subject that as

Metazoa – Morphology and Evolution of Animals Achim Paululat, Günter Purschke, 2025-08-23 Over the course of evolution multicellular animals Metazoa have successfully colonized every conceivable habitat on our planet thanks to their ability to survive and adapt under adverse or changing conditions But how is an animal's body structured to accomplish this What organs do animals have how do they perceive their environment and what is the evolutionary relationship between these seemingly so different organisms This volume designed as a modern practical book presents the most important body plans of selected animals It is intended to help all Biology students to recognize and understand the basic body shapes and structures in the respective animal groups including the main features that have contributed to their evolutionary success the similarities and differences and the many different solutions that evolution has come up with for given biological problems The authors have consistently used focused compact text and photographs that not only show the animals most important external features but also explain the dissection process step by step The authors hope that this new book will help all Biology students successfully complete their practical zoology course and gain new insights into the morphology and evolution of animals

Symbiosis in Fishes Ilan Karplus, 2014-04-09 Symbiosis in Fishes provides comprehensive coverage of the biology of partnerships between fishes and invertebrates ascending the phylogenetic scale from luminescent bacteria sponges and coelenterates to molluscs crustaceans and echinoderms Both facultative and obligatory partnerships are reviewed with emphasis on the behavioral ecological and evolutionary aspects of fish symbiosis Each of the eight chapters of this book focuses on a different group of partners The structure physiology and anti predatory strategies of each group are described to provide the necessary background for the

understanding of their partnerships with fishes The formation of the associations the degree of partner specificity and its regulation as well as the benefits and costs for the fishes and their associates communication between partners and their possible co evolution are discussed in each chapter This is the first attempt to critically review in a single volume all associations of fishes with invertebrates based on the latest studies in these areas together with studies published many years ago and little cited since then Symbiosis in Fishes provides a huge wealth of information that will be of great use and interest to many life scientists including fish biologists ecologists ethologists aquatic scientists physiologists and evolutionary biologists It is hoped that the contents of the book will stimulate many to further research to fill in the gaps in our knowledge in this fascinating and important subject Libraries in all universities and research establishments where biological sciences are studied and taught should have copies of this exciting book

Annelida Greg Rouse,Fredrik Pleijel,Ekin

Tilic,2022-01-14 Annelids the segmented worms exist in a remarkably diverse range of mostly marine but also freshwater and terrestrial habitats varying greatly in size and form Annelida provides a fully updated and expanded taxonomic reference work which broadens the scope of the classic Polychaetes OUP 2001 to encompass wider groups including Clitellata comprising more than a third of total annelid diversity Sipuncula and Thalassematidae formerly Echiura It reflects the enormous amount of research on these organisms that has burgeoned since the millennium principally due to their use as model organisms to address wider and more general evolutionary and ecological questions Beginning with a clear introduction to the phylum and an outline of annelid taxonomy this authoritative text describes their collection the methods to ensure their optimal preservation and an overview of anatomy with its relevant terminology The core of the work comprises 77 fully up to date taxonomic chapters informed by anatomy and the latest molecular phylogenomic evidence and carefully organised based on a new robust phylogenetic hypothesis Lavishly illustrated throughout with hundreds of previously unpublished high resolution colour images and SEM micrographs the sheer beauty and diversity of the annelids is nowhere better presented Annelida is the definitive reference work for annelid biologists whilst being of interest to a broader audience of invertebrate zoologists systematists and organismal biologists

Social Recognition in Invertebrates Laura

Aquiloni,Elena Tricarico,2015-05-29 This book uses a wide range of case studies from different invertebrate taxa to describe the numerous forms of social recognition occurring in this large group of animals and traces the evolution of this cognitive ability The authors provide several examples of direct i e the target of recognition is a conspecific and indirect recognition i e recognition of a reliable proxy rather than an individual such as a den or a substrate and discuss cases of familiar recognition i e an animal remembers a conspecific but cannot tell what class it comes from or recognize its identity Class level recognition i e an animal assigns a conspecific to an appropriate class of animals and true individual recognition i e an animal both identifies and recognizes a conspecific on an individual basis are also addressed

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