

Contents

Preface	xi
Acknowledgements	xiii

I Historical Review	3
Descriptive phase	4
Comparative phase	7
Experimental phase	9
References	15

II Introduction	17
Gametogenesis and gametes	17
Origin of germ cells	17
Formation of gametes	22
Fertilization	43
Development, Early development	60
References	64

KINGDOM PROTISTA 67

III Phylum Protozoa	69
Class 1- Mastigophora	69
Subclass Phytoflagellata	69
Order Volvocida	69
<i>Chlamydomonas</i>	69
<i>Volvox</i>	79
Class 2- Sarcodina	87
Subclass Rhizopoda	87
Order Foraminifera	87
<i>Diffugia</i>	88
Subclass Actinopoda	89
Order Heliozoa	89
<i>Actinophrys</i>	89
Class 3- Sporozoa	91
Subclass Telosporidea	91
Order Coccidiomorpha	91
Suborder Coccidia	91
<i>Eimeria</i>	91
Order Gregarina	91
<i>Monocystis</i>	94

Class 4-Ciliophora	95
Subclass Ciliata	95
Order Holotricha	95
Suborder Hymenostomatida	95
<i>Paramecium</i> , Conjugation	96
References	101

KINGDOM ANIMALIA 103

Table of classification of Kingdom Animalia	103
---	-----

Subkingdom Parazoa 105

IV Phylum Porifera (parazoa)	107
Definition	107
Historical review	107
General characteristics	107
Classification	109
Embryological characteristics of Porifera	110
Reproduction	110
Development	131
Class Calcarea	131
1- Subclass Calcaronea	131
2- Subclass Calcinea	137
Class Hexactinellida	138
Nutrition of the embryos	162
Larval release	162
Larval behaviour and settling	162
Metamorphosis	162
Oviparous sponges	162
Types of larvae	164
Biological associations	167
References	167

Diploblastica 171

V Phylum Cnidaria	173
Definition	173
General characteristics	173

Classification	175	Reproduction	390
Body plan of Cnidaria	177	Reproductive system	390
Reproduction	177	Egg activation and the first block to polyspermy	397
Spawning	181	Double eggs in Nemertinea	397
Embryogenesis	183	<i>Micrura alaskensis</i>	405
Class Hydrozoa	187	<i>Procephalothrix stimulus</i>	416
Class Scyphozoa	212	References	418
Class Cubozoa	239		
Class Anthozoa	253		
Representatives	253		
References	303		
VI Phylum Ctenophores	309	Pseudocoelomata	421
Definition	309		
Distinctive features	309	IX Phylum Nematoda	423
Classification	310	Definition	423
<i>Hormiphora plumosa</i>	311	Historical review	423
Reproduction	311	General characteristics	424
Regeneration	311	Classification	424
Brooding	313	Reproduction	426
Development	320	Development	445
<i>Mnemiopsis leidyi</i>	326	Chromatin diminution	447
Hatching	335	Embryological peculiarities	452
Brooding	335	Anabiosis	455
References	336	<i>Caenorhabditis elegans</i>	455
		Historical review	455
		Sex differentiation	457
		Variation in nematode embryology	465
		References	469
Triploblastica	337		
Acoelomata	337	Coelomata	471
VII Phylum Platyhelminthes,		Supraphylum Arthropods	
Turbellaria	339	Mandibulata	473
Definition	339		
Introduction	339	X Phylum Crustacea	477
Distinctive features	339	Definition	477
Classification	340	Historical review	477
Order Acoela	341	A Branchiopoda	484
Reproduction	345	I Anostraca	484
Order Polycladida (<i>Notoplana</i>)	354	II Diplostraca	493
Order Rhabdocoela	366	B Cirripedia (Barnacles)	503
Order Tricladida	380	C Malacostraca	518
Development of composite eggs	380	1 Hoplocarida (Stomatopoda)	518
References	385	2 Eucarida	530
		Order Decapoda	530
VIII Phylum Nemertea	389	Family Penaeidae	532
Definition	389	<i>Penaeus kerathurus</i>	532
Introduction	389	Reptantia	590
Distinctive features	389	Astacidea (Astacura)	590
Classification	390	<i>Astacus fluviatilis</i>	606
		Brachyura	629
		<i>Portunus pelagicus</i>	631

The male system	633	Reproduction	816
Formation of the spermatophore		Spermatophores	822
of <i>P. pelagicus</i>	641	Spermatophore of <i>Sepia officinalis</i>	823
Formation of the spermatophore		Dehiscence of spermatophore	831
of <i>C. danae</i> Smith 1869	653	Formation of spermatophore	833
Formation of the spermatophore		Hardening of spermatophore	839
of <i>Chionoectes opilio</i>	655	Reproductive behaviour, mating,	
The female system	658	copulation, and spawning	850
Copulation	660	Development	851
Utilization of lipovitellin during		Organogenesis	855
Embryogenesis	700	References	857
References	704		
 XI Phylum Mollusca	 715	 Phylum Chordata	 861
Definition	715	 XIII Subphylum Urochordata, Tunicata	 863
General features of Mollusca	715	Definition	863
Classification of Mollusca	716	General characters	863
Class- Amphineura	716	Class Ascidiacea	864
Polyplacophora	716	Order 1- Enterogona	865
Reproduction	716	Order 2- Pleurogona	865
Monoplacophora	733	Reproduction	865
Aplacophora	735	Spawning	874
Class- Gastropoda	739	Fertilization	874
Reproduction	739	Embryogenesis	877
<i>Eremina ehrenbergi</i>	741	Structure of fully formed larva	888
Differentiation of germ layer	793	Experimental studies	890
References	810	References	898
 XII Cephalopoda (Siphonopoda)	 815	 Further Reading	 901
General characters	815	Index	905
Classification	815		