11025

## THE CARLSBERG FOUNDATION'S OCEANOGRAPHICAL EXPEDITION ROUND THE WORLD 1928—30 AND PREVIOUS "DANA"-EXPEDITIONS

UNDER THE LEADERSHIP OF THE LATE PROFESSOR JOHANNES SCHMIDT

DANA-REPORT No. 67.

## LARVAE OF DECAPOD CRUSTACEA THE OCEANIC PENAEIDS

SOLENOCERA - CERATASPIS - CERATASPIDES

BY

POUL HEEGAARD

WITH 345 FIGURES IN THE TEXT

PUBLISHED BY THE CARLSBERG FOUNDATION

THIS PAPER MAY BE REFERRED TO AS: DANA-REPORT No. 67, 1966

JOHN S. GARTH Allan Hancock Foundation University of Southern California Los Angeles, California 90007 MAY 1 5 1966

COPENHAGEN

ANDR. FRED. HØST & SØN

PRINTED BY BIANCO LUNO A/S

1966

## CONTENTS

	Page		Page
Preface	5	Solenocera sp. larva aequatorialis	47
General part	8	Mysis II  Distribution and remarks	$\frac{47}{52}$
Rate of growth	8	Solenocera sp. larva danae	53
Solenocera	11	Protozoea III	53 56
History	11	— ш	59
Description	12 12	— III  Distribution and remarks	62 65
Abdomen and telson	15	Solenocera sp. larva sumatransis	66
Special sense organs	17 18	Mysis I	67 70
Appendages	18 20	- III	74
Larval stages	22	IV  Distribution and remarks	77 79
Protozoea I	$\begin{array}{c c} 23 \\ 23 \end{array}$	Solenocera sp. larva nodulosa	81
— III	23 23	Mysis II  Distribution and remarks	81 85
— и	24	Solenocera sp. larva elongata	85
— III	25 25 26	Protozoea III  Distribution and remarks	85 88
	97	Solenocera sp. larva barbata	89
Special part	27	Protozoea III	$\frac{89}{92}$
Diagnosis for the larvae of Solenocera	27	Solenocera novae-zealandiae?	93
Solenocera membranacea  Protozoea III	27 28 30	Protozoea III	93 96
— II	31	Relation between the species of Solenocera	97
Distribution and remarks	31	I. The Atlantic group	98
Solenocera membranacea subsp. capensis  Protozoea III	32 33	II. The Indian Ocean groupIII. The East-India group	98 99
Mysis I	34 34	Cerataspis and Cerataspides	99
Distribution	35	History	99
Solenocera muelleri	37	- AV	100
Mysis I	37 40	CarapaceAbdomen and telson	
Distribution and remarks		Appendages	

Page	Pag
Larval stages 102	Mysis II
Mysis I	— III 123
— II 103	— IV 12
— III 103	— V 12
— IV 103	- VI? 12
- V 104	Distribution
Diagnosis for the larvae of Cerataspis 104	Diagnosis for the larvae of Cerataspides 12
Cerataspis petiti	Cerataspides longiremis
Mysis I	Mysis I
— II 110	— II 13
- III 112	— III 13
- IV	— IV 13
- V 115	— V 13
Distribution and remarks	Remarks 14
Distribution and remarks	Distribution
Cerastaspis monstrosa	Between to age!
Mysis I	List of literature 14

## PREFACE

The present paper deals with larval forms of the oceanic Penaeid genera Solenocera, Cerataspis and Cerataspides.

The material for this investigation arrives from three different sources: (1) The Carlsberg Foundation sponsoring different "Dana" and other expeditions, supplemented with material of larvae of Solenocera membranacea from expeditions of the Danish fishery research vessel "Dana" in the Atlantic south of Ireland and towards Bretagne, (2) material from the Zoological Museum of the University of Copenhagen and (3) the material placed in the British Museum, London.

Detailed information on the collection of the material from expeditions sponsored by the Carlsberg Foundation, Denmark, is given in the following three papers:

- 1. Introduction to the Oceanographic Reports. The Danish "Dana"-Expeditions 1920–22. By Johns. Schmidt. Oceanogr. Rep. edited by the "Dana" Committee No. 1, Copenhagen 1929.
- 2. Introduction to the Reports from the Carlsberg Foundation's Oceanographical Expedition Round the World 1928-30. Dana-Report No. 1, Copenhagen 1934.
- 3. List of Supplementary Pelagic Stations in the Pacific Ocean and the Atlantic with an Introduction by Å. Vedel Taning. Dana-Report No. 26, Copenhagen 1934.

These three papers describe the basis for the "Dana"-Expeditions, state their purposes and extension and explain the sampling methods and the gear used. They further include complete lists of stations and hauls with all information on position, temperature, depth, gear, etc.

An additional part of the material is from the collections of the Zoological Museum of the University of Copenhagen. The material from this source includes the major part of the specimens of *Cerataspis* and *Cerataspides* and was collected in the second half of the 19th century by captains of the Danish Navy and Commercial Fleet. In the lists of available material heading the description of each larval stage the material from the Zoological Museum of the University of Copenhagen is marked Z.M.

The last part of the material is from the collections of the British Museum Natural History, London, from where I have received all available material on the three genera included in this paper. The material is collected by the different "Discovery" Expeditions, the British Antarctic ("Terra Nova") Expedition 1910, and the "Great Barrier Reef" Expedition. Included are also a few samples from other sources. All the material belonging to the British Museum is in the lists of localities marked B.M.

For further information on locality, bottom, temperature, depth, gear, etc. are referred to the following papers:

- 1. "Discovery" Investigations. Station list, 1925-1927. "Discovery" Report, vol. I, Cambridge, 1929.
- 2. "Discovery" Investigations. Station list, 1929-1931. Ibid. vol. 4. Cambridge, 1932.
- 3. G. E. R. Deacon: A General Account of the Hydrology of the South Atlantic Ocean. Ibid. vol. 7. Cambridge, 1933.
- 2 Dana-Report No. 67, 1966.