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Issued on the occasion of the Workshop on
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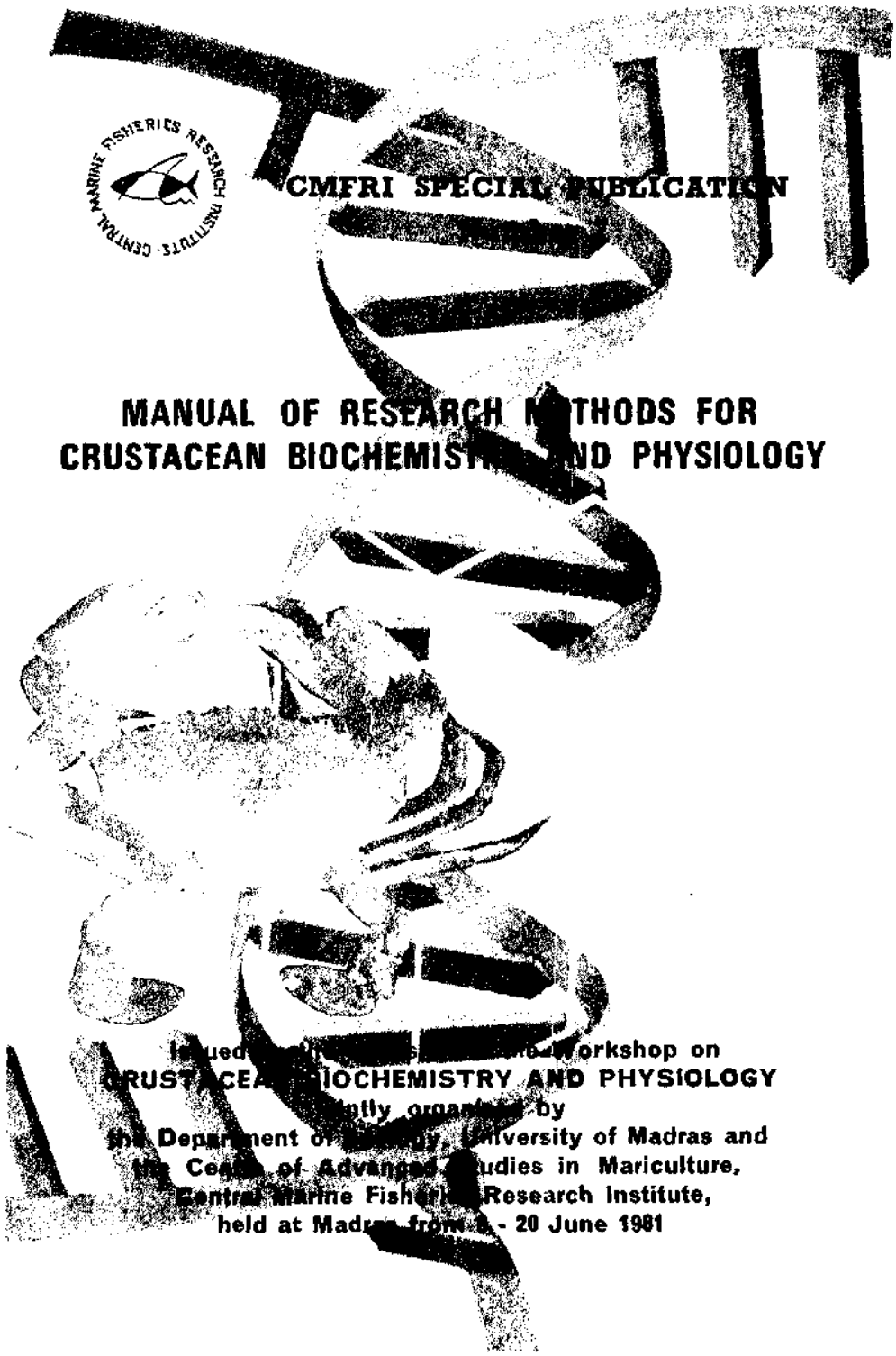
jointly organised by
the Department of Zoology, University of Madras and
the Centre of Advanced Studies in Mariculture,
Central Marine Fisheries Research Institute,
held at Madras from 8 - 20 June 1981



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Manual of Research Methods for Crustacean Biochemistry and Physiology

EDITED BY

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AMMONIA EXCRETION AND UPTAKE * 19

19.1. Introduction

Ammonia is one of the major excretory products of aquatic crustaceans. The rate of ammonia excretion may reflect the activity of the animal (Subhashini, 1981). Ammonia excretion in crabs as well as in several isopods show diurnal variation (Kirby & Harbaugh, 1974 ; Subhashini, 1981). The amount of ammonia excreted by the animal can be determined by placing the animal in ammonia free artificial sea water, following the method as mentioned in 8.0. Crabs are known to take in ammonia from the medium (Mangum & Towle, 1977 ; Subhashini, 1981).

19.2. Reagents

1. *Artificial sea water* : Subow recipe as cited by Sverdrup *et al.* (1961).

   NaCl-26.518 gm ; $MgCl_2$-4.47 gm ; $MgSO_4$-3.305 gm ; $CaCl_2$ - 1.141 gm ; KCl - 0.725 gm ; $NaHCO_3$ - 0.202 gm ; NaBr - 0.083 gm.

   Dissolve in 2 litres of distilled water.

2. 10 *mM ammonium chloride in artificial sea water.*

3. Reagents for ammonia determination as mentioned in 8.2.

19.3. Procedure

19.3.1. Excretion :

1. Keep the crabs in individual clean plastic tanks holding 2 litres of 50% artificial sea water, free of ammonia. Give

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* Prepared and verified by M. H. Subhashini & M. H. Ravindranath, School of Pathobiology, Department of Zoology, University of Madras, Madras-600 005.

aeration throughout the experiment. A tank of artificial sea water without animal serves as control.

2. Periodically take quadruplicates of 0.1 ml of water sample, make upto 1 ml with double distilled water and analyse for the presence of ammonia following the method mentioned in 8.0.
3. Calculate the rate of ammonia excretion by calculating the amount of ammonia in 2 litres of water/gm body weight of animal/hour.

19.3.2. Uptake :

Maintain the crabs in 2 litres of 50% artificial sea water containing 10 mM of ammonium chloride. All the other conditions and procedures are same as mentioned for ammonia excretion.

Calculate ammonia uptake/excretion by substracting ammonia concentration in the medium at different hours from that found initially in the medium.

19.4 References

KIRBY, P. K. & R. D. HARBAUGH, 1974. Diurnal patterns of ammonia release in marine and terrestrial isopods. *Comp. Biochem. Physiol.*, **47** *A* : 1313-1321.

MANGUM, C. P. & D. TOWLE. 1977. Physiological adaptation to unstable environments. *American Scientist*, **65** : (1) : 67-75.

SUBHASHINI, M. H. 1981. Studies on haemolymph proteins of the crab *Scylla serrata* Forsskal (Crustacea : Decapoda). Ph.D. Thesis, University of Madras, p.252.

SVERDRUP, H. V., M. W. JOHNSON & R. H. FLEMMING. 1961. *The oceans ; their physics, chemistry and general biology*. Asia Publishing House, Madras. pp.1087.