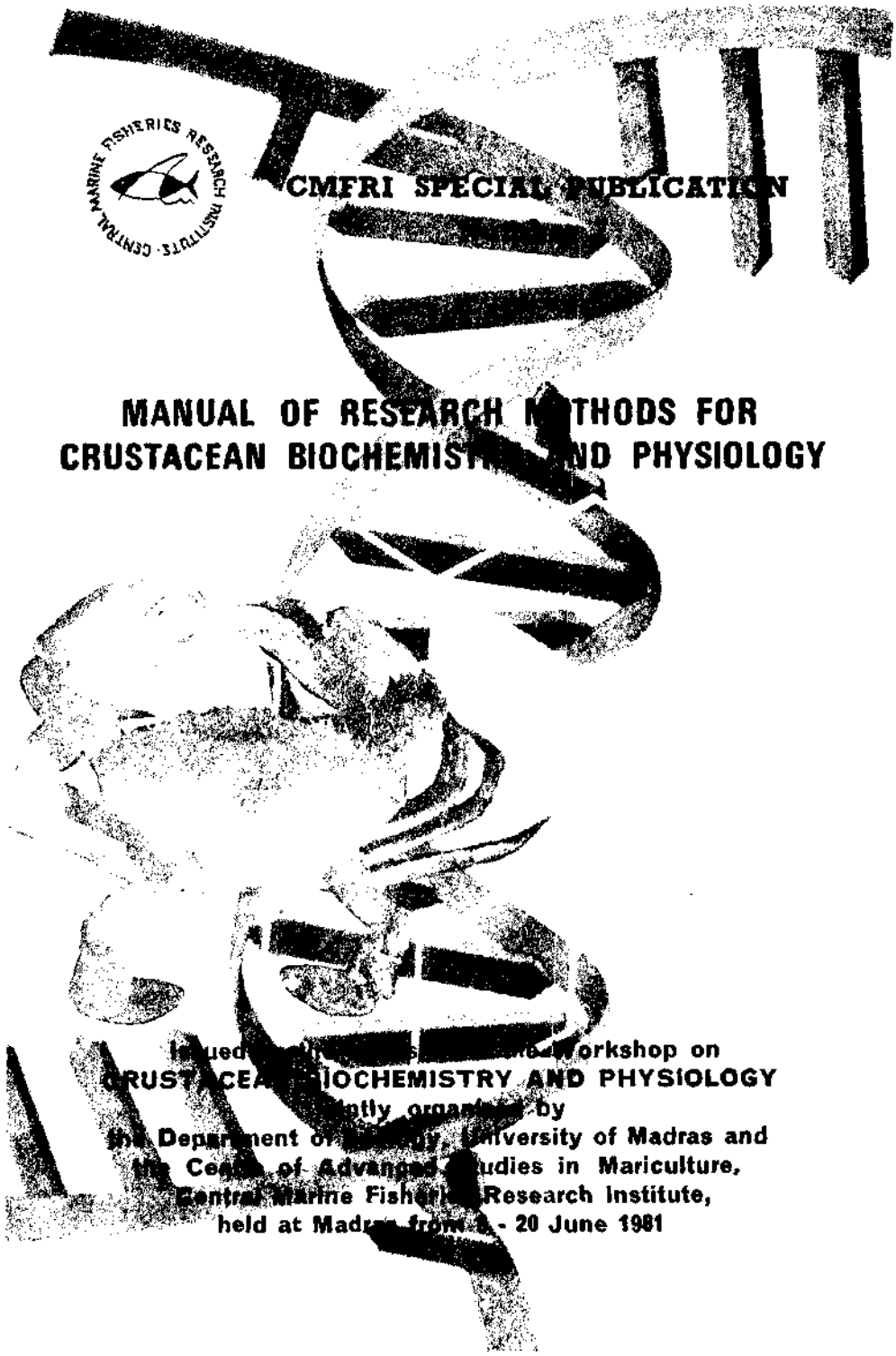
CMFRI SPECIAL PUBLICATION
Number 7

MANUAL OF RESEARCH METHODS FOR CRUSTACEAN BIOCHEMISTRY AND PHYSIOLOGY

Issued on the occasion of the Workshop on
CRUSTACEAN BIOCHEMISTRY AND PHYSIOLOGY
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

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(LIMITED DISTRIBUTION)

Published by : **E. G. SILAS**
Director
Central Marine Fisheries
Research Institute
Cochin 682 018

PRINTED IN INDIA
AT THE DIOCESAN PRESS, MADRAS 600 007—1981. C2375.

STUDENTS 't' TEST * 22

22.1 PAIRED SAMPLE 't' TEST

In 't' test for mean difference, the significance of a difference between 2 sample mean is tested. Under certain conditions 2 sets of sample values may be related to one another. Such paired data may be tested to see if the mean difference between the pair is significant by different from zero.

$$i.e.\ t = \frac{\text{mean difference between the pairs}}{\text{standard error of the mean difference}}$$

1. $x_1 - x_2 = y$
2. Σy
3. $(\Sigma y)^2$
4. Σy^2
5. $$\frac{\Sigma y^2 - \frac{(\Sigma y)^2}{n}}{n-1} = Sy$$

$$\therefore t = \frac{y}{Sy}$$

22.2. 't' TEST FOR MEAN DIFFERENCE

Whether the means of two normally distributed samples are significantly different at a particular level of probability or not may be tested with the following prerequisites.

1. Means of two samples ($\bar{x}_1$, $\bar{x}_2$), their differences, $\bar{x}_1 - \bar{x}_2$.
2. Variance (s_1^2, s_2^2) of two samples i.e.

$$\frac{\Sigma x_1^2 - \frac{(\Sigma x_1)^2}{n_1}}{n-1} = s_1^2 ; \qquad \frac{\Sigma x_2^2 - \frac{(\Sigma x_2)^2}{n_2}}{n_2 - 1} = s_2^2$$

* Prepared by M. Arumugam, School of Pathobiology, Department of Zoology, University of Madras, Madras-600 005.

3. The variance of means $\frac{s_1^2}{n}$, $\frac{s_2^2}{n}$ and

4. The variance of the difference between the two means 1 & 2 (sum of the variances of the samples).

5. Calculating standard error of the difference beween the variances of the means $\frac{s_1^2}{n} + \frac{s_2^2}{n}$

6. 't' is the ratio of the differences between the means and the standard error of difference between the variances of the means.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

For your own notes