CMFRI SPECIAL PUBLICATION
Number 7

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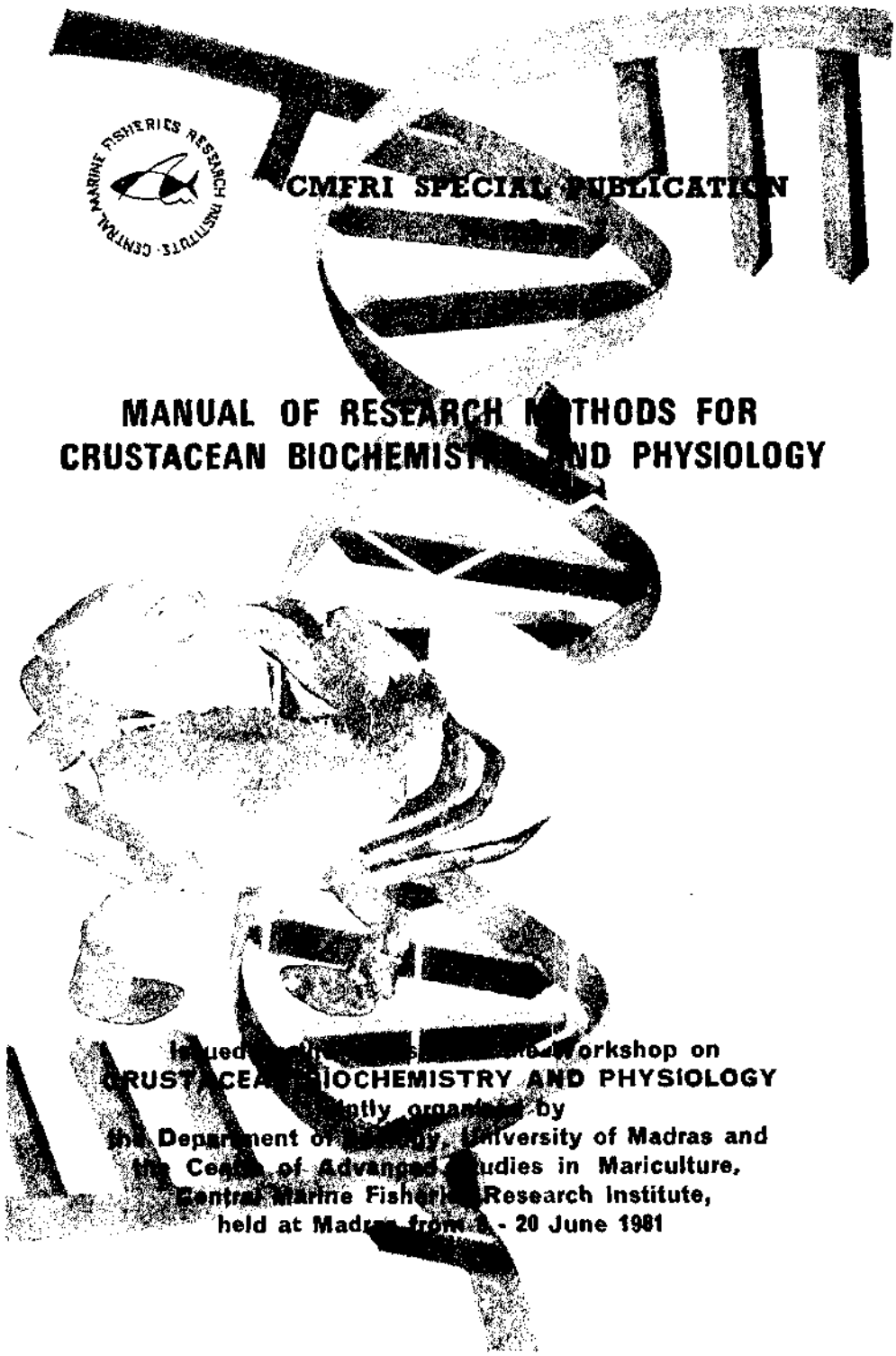
Issued on the occasion of the Workshop on
CRUSTACEAN BIOCHEMISTRY AND PHYSIOLOGY
jointly organised by
the Department of Zoology, University of Madras and
the Centre of Advanced Studies in Mariculture,
Central Marine Fisheries Research Institute,
held at Madras from 8 - 20 June 1981



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Manual of Research Methods for Crustacean Biochemistry and Physiology

EDITED BY

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ANALYSIS OF VARIANCE (ANOVA) * 26

In t-test, the difference between 2 sample means are tested for significance. In ANOVA the differences between means of more than 2 samples are tested for significance. This is done by examining the variation within the whole groups of sample means. It consists of a comparison between 2 estimates of the overall variation (of the complete set of measurements included in the analyses), one estimate being based on the variance of sample means about the grand mean. The other based on the variance of the individual measurements about their treatment means. The first estimate is called *treatment variance*. The second estimate is called *error variance*. If the null hypothesis is true, the ratio of these estimates would approximate 1. If, on the other hand, the sample means estimates differ from the population or group means then the ratio would exceed 1. In practice, this ratio is calculated as F and the level of probability of obtaining such a ratio is determined if the null hypothesis were to be true.

The following prerequisites are necessary for calculating the analysis of variance.

1. Different groups or treatments (T)
2. Sample size of each group (n)
3. Number of treatments (k)
4. Individual values (x)

With the above requirements the following are calculated :

1. Correction term (c) :

Correction term (c) is the square of the sum of all values of x divided by the total number of values $= (\Sigma x)^2/n$.

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

2. Total sum of squares (SS) :

In this, c is subtracted from the sum of squares of individual values of x.

$$\therefore \quad SS = \Sigma x^2 - c$$

3. Sum of squares for treatments (SST) :

The sum of the squares of sum of each treatment is divided by the number of treatments and then the correction term is subtracted.

$$SST = \frac{T^2}{n} - c$$

4. Sum of squares for error (SSE) :

Sum of squares for treatments is subtracted from total sum of squares :

$$\therefore \quad SSE = SS - SST$$

5. Degrees of freedom of SST and SSE.

6. Mean squares of SST and SSE :

This is calculated by dividing SST and SSE by its respective degrees of freedom.

7. The F- is calculated by dividing mean squares for treatments by mean squares of error.

The calculated F value is compared with the tabulated F value.

26.1 References

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For your own notes