

## **M.S.101. KESAVAN NAIR, A.K.—Statistical Methods in Gear Selectivity and Gear Efficiency Studies—1988—Dr. K. Alagaraja.**

Studies on gear selectivity have received great attention while gear efficiency studies do not seem to have received equal consideration. In temperate waters fishing industry in general, is well organised and relatively large and well equipped vessels and gear are used for commercial fishing and the number of species are less; whereas in tropics particularly in India, small scale fishery dominates the scene and the fishery is multispecies operated upon by multigear. Therefore many of the problems faced in India may not exist in developed countries. Moreover, there is a paucity of literature on methods of comparison of fishing gear efficiency, though much work has been carried out in assessing relative efficiencies. Hence, main subject of interest in the present thesis is an investigation into the problems in comparison of fishing gears, especially in using classical test procedures with special reference to the prevailing fishing practices, in other words, with reference to catch data generated by the existing system. This has been taken up with a view to standardizing an approach for comparing the efficiency of fishing gear. Besides this, the implications of the terms 'gear efficiency' and 'gear selectivity' have been examined and based on the commonly used selectivity model, estimation of the ratio of fishing power of two gear has been considered. An attempt to determine the size of fish for which a gear is most efficient has also been made. The work has been presented in eight chapters dealing with

- (i) the minimum number of fishing trials required for comparison of trawl nets when the classical F-test relevant to two way ANOVA is applied.
- (ii) a simulation study to trace the problems faced in the classical approach along with consideration of nonparametric and other methods;
- (iii) the problem of nonadditivity in the relevant two way ANOVA and steps to overcome the same;
- (iv) problems in efficiency comparison of gill nets;

- (v) comparison of gill net catches using a test based on the distribution of catches;
- (vi) an approach for the efficiency comparison within the trawl nets and within the gill nets for comparisons involving two and more than two gear;
- (vii) the distinction between gear efficiency and gear selectivity and
- (viii) estimation of the ratio of fishing power associated with gear selectivity models and determination of the size of fish for which a gear is most efficient.

The first six chapters are on gear efficiency and the last two on gear selectivity. The suitability of the classical test normally used, has been considered. It is found that the data are not suitable for direct application of this test. One of the major problems was found to be nonadditivity. This has been considered in chapters one and two. Gear efficiency studies lead to determination of superiority of one gear over the other/others when the gear have different efficiencies. There are two cases when the difference may not be discernible. The obvious case is one when the efficiencies of the gear are more or less equal. There is another case which is normally overlooked where in spite of the existence of differences in the efficiencies, experimental results are not able to bring them out. This has been studied in chapter three. In the earlier chapters, data from trawl nets were considered. To extend this work on gill nets, further work has been done and the same has been presented in chapters four and five. Combining the results of the earlier chapters, a general guideline is indicated to compare the efficiencies of trawl and gill nets separately in chapter six. In the last two chapters, the distinction between gear efficiency and gear selectivity has been brought out. In addition, estimation of the ratio of fishing power associated with gear selectivity model and determination of the size of fish for which a gear is most efficient have also been considered.