

Study on the Species Assemblages of Tropical Continental Shelves, Based on the Trawl Data Collected by the "R.V. Dr. F. Nansen", 1975-1988

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Since 1975 the FAO/NORAD R.V. "Dr. Fridtjof Nansen" has carried out surveys on the continental shelves and upper slopes of several coastal countries of tropical areas of the Indian, Atlantic and Pacific oceans. The main objective has been, especially at the beginning of the project, to evaluate the fish biomass of the pelagic resources by the acoustic method. However, an important part of the survey activities has also consisted of pelagic and bottom trawling and collection of biological data.

As a result, a large amount of catch per effort data, in weight and number by species and by station have been collected and stored in a database which is updated in the course of each survey. At the beginning of this project, the survey reports have mainly provided highly aggregated results (e.g., total absolute biomass based on the acoustic method or on swept area estimates) but in later years greater emphasis has been given to a detailed analysis of the data collected.

Since last year I have started a study of species assemblages of the Western Indian ocean (Pakistan to Mozambique/Madagascar) based on the trawl data in this database and the idea is to eventually extend this work to the other areas surveyed.

The main objective is to describe the patterns of species associations and relate them to environmental conditions, depth etc. and, where repeated surveys were carried out in the same region, to try to detect differences in species associations with time.

Ordination and classification of the stations is carried out using the well known DECORANA and TWINSPAN programs also mentioned by J.W. MacManus and P.A. Roa in their article in *Fishbyte* April 1988 and using a clustering program (COMPAH) which has several options regarding the type of transformation, standardization, similarity indexes and clustering algorithms one wishes to use.

I would like to add that in the case of very large data sets a rapid initial clustering may be carried out with the program COMPCLUS (Cornell Ecology Programs) to identify the general patterns of association. Furthermore, in July 1987 the Cornell Ecology Programs Series has introduced an MS-DOS Micro-computer package which includes, among others, the above-mentioned COMPCLUS, TWINSPAN and DECORANA.

The advantage of this new package is that the computer workload rises only linearly with the amount of data and small computers with 256 to 512K bytes of memory can handle data sets having hundreds of species and samples.

Another interesting development in ordination techniques is the modification applied, in 1987, to DECORANA by C.J.F. ter Braak. The classical DCA (Detrended Correspondence Analysis) algorithm (i.e., the main option in the DECORANA program) has proven to be overzealous in correcting the defects of correspondence analysis and may sometimes lead to the unwitting destruction of ecologically meaningful information (Pielou, 1984). The new, improved version of DECORANA by C.J.F. ter Braak is included in a new program package called CANOCO, also available for IBM compatibles, from TNO Institute of Applied Computer Science, Box 100, 6700 AC Wageningen, The Netherlands, for a moderate price.

Reference

- Pielou, E.C. 1984. *The interpretation of ecological data. A primer on classification and ordination.* Wiley, New York, 263 pp.
MacManus, J.W. and P.A. Roa. 1988. Finding gradients and groups of stations and species. *Fishbyte* 6(1):19.