

A review of important concepts in the trophic organization of pelagic ecosystems

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ABSTRACT: The physical environment has an important influence on the size composition of primary producers in plankton communities. This effect is transmitted through the trophic structure by size selective feeding processes at each level. A pictorial representation of trophic organization in pelagic ecosystems is presented which illustrates the complex involvement of individual species in the food web and the dynamic nature of ecosystem development along alternate pathways.

INTRODUCTION

The trophic organization of pelagic ecosystems has long been recognized as an important consideration in assessing the ultimate yield of the oceans in terms of fisheries (Steele, 1965; Ryther, 1969; Parsons & LeBrasseur, 1970). Trophic structures of plankton communities in areas of high and low fish yields have been characterized as fundamentally different, based on the position of fish relative to the source of primary production in a linearized food chain. Recent efforts towards understanding the predictable consequences of pollutant additions and fisheries overexploitation within planktonic communities have de-emphasized the abstraction of an inflexible food chain in favor of a multidirectional web approach which more realistically represents the roles of different taxa and size classes in alternate pathways of ecosystem development (Greve & Parsons, in press; Steele & Frost, in prep.). My aim in this paper is to review important concepts in the trophic organization of planktonic communities within a context which is relevant to a dynamic interpretation of the environmental control of trophic-structure development in pelagic ecosystems and the potential effects of man's impact on the marine environment.

* This research was supported in full by the National Science Foundation, Grant No. NSF OCE76-02035.