The food web of *Posidonia oceanica* beds around the Island of Ischia (Gulf of Naples -Italy) : a new trophic index

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The Posidonia oceanica system, characterized by high productiv and biomass partly exported to other coastal systems, supports a v complex food web (Chessa et al., 1982). Many trophic studies can need to define the energy flow through the system: gut cont analysis, calorific measurements, weight data, trophic groups analys etc (ref. Kikuchi et Peres, 1977). The trophic behaviour of mac zoobenthic species sampled by a bottom trawl in different prairies analyzed and a new index is proposed as a feeding behaviour descript The use of such an index allows for a precise description of feeding habits of a species and is useful in direct spat representations and multivariate analysis techniques.

Twelve samples were obtained in different Posidonia prairies around island of Ischia: the first 6 in winter, the others in summ collected at depths ranging from 15 to 25 meters with a bottom tr with a 2 cm mesh, deep frozen and then fixed in 70% alcohol. The contents of each species in each sample were identified, quantified means of an arbitrary code ranging from 0 to 4 (0=absent; 4=v abundant) and recorded in a matrix "species/food items". A multivari analysis was performed on such data to define the principal compone of the trophic model in the studied prairies (fig.1). It is a fact t generally, in such analysis, the observation points are ordered mai on the first two axes, one of which can be mainly related to prey si while on the second the food items are ordered according to type -pl or animal- of prey. If the principal components of such trophic mod are these, it is possible to redescribe the species on the basis these factors. The species were coded on the basis of a two di parameter calculated as follows:

- the first digit represents the feeding habit -vegetarian carnivorous- of the species and is calculated by the formula:

$$\textbf{first digit}=(\sum V - \sum C)/\sum M$$ whe

V=abundance of vegetal items; C= abundance of carnivorous ite M=abundance of each considered item. In such a way we can distingu omnivorous organisms (first digit close to 0), pure carnivores (fi digit close to -1), pure herbivores (first digit close to 1).

- The second digit represents the size scale of the prey and calculated by the formula:

$$\textbf{second digit}= \ln (\sum (PS_i \times N_i)/\sum M)$$ whe

PS_i= mean prey size (size measured in mm or in mg) of prey "i"; N_i= abundance; M= as defined previously. The use of logarithmic sc allows to discriminate microphagous organisms, eating prey items l than 1 mm (second digit negative) from macrophagous ones (second di with positive values).

A total of 76 species were collected, while 26 food items w identified in the gut contents. A matrix was then compiled on the ba of the trophic code and it is possible to see that, plotting different species on a x-y system using the two digits of the code descriptors, a model very close to the multivariate one is obtained. particular we observe that the principal clusters showed by a P.C are reproduced in the new code based trophic model (fig. 1 and Species can be then grouped into trophic categories as shown in fig to be analyzed by common mathematical methods and such groups are far better descriptors then those generally defined only on an empi basis. As one can observe, the two representations -using the t items and trophic index plotted- directly provide a single model of prairie, in which the importance of vegetarian and detritivo organisms is assessed. Predators are represented only by a few spec of fishes plotted in the second quadrant. The model obtained is us to classify the 96 considered species into calculated tro categories as far as the trophic index calculated for each species be considered relatively constant of any ecosystem, while t position in a multivariate analysis model depends on the contribut of other observations considered.

The trophic index described can be considered a valid solution compare data resulting from different investigations and may be use define the differences observed in the feeding behaviour of a spe studied on different temporal or spatial scales. The use of this i allows to get over the first ordination model, given that food it are generally ordered on the basis of size and qualitative compone Our research can thus be directed in the definition of measurable comparable trophic groups and food web models.

P.C.A. Classification by two digits co

Fig. 1 Fig

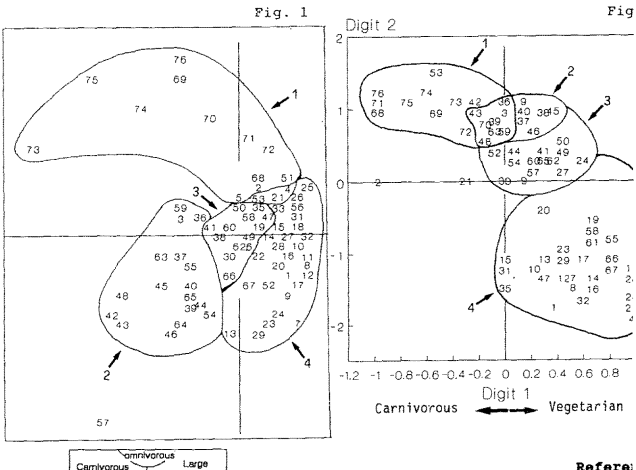
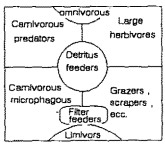


Fig.3



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