

# INDICATIONS OF A POSSIBLE CHANGE IN THE FISHERY EXPLOITATION PATTERN IN IONIAN SEA LAGOONS

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## Abstract

Continuous daily fishery landings (1977-2003) from four adjacent lagoons of Amvrakikos Gulf (Western Hellas; Ionian Sea) using barrier traps were analyzed herein. During the last 30 years, the general area has been subjected to a high degree of human impacts that might influence the fish and fisheries dynamics. Two of the studied lagoons indicated an alteration in their seasonal pattern that marked by an increase of spring landings and a great reduction of autumn-winter ones.

**Keywords:** Lagoons, Coastal Management, Ionian Sea, Fisheries.

## Introduction

In lagoons, landings from barrier traps are based on the species-specific inshore-offshore seasonal or ontogenic fish migrations [1]. In this context, we analysed a 27-year (1977-2003) fisheries landings series derived from four lagoons of Amvrakikos Gulf (Western Hellas; Ionian Sea) using barrier traps. Although fishery exploitation is limited during spring (traps are opened), in the studied lagoons the traps are remaining active (closed) allowing only the entrance of juveniles and small-sized fish. Hence, the aim of the study was to detect changes in seasonal species composition through time and to determine possible causes of this pattern.

## Materials and Methods

Fishery exploitation took place by the same fisher cooperation during the study period, a fact that guaranteed data validity, homogeneity and stability of fishing effort variability. Fishing period was considered to start at March, till the end of next February, as there is not any fishery legislation that regulates fishing period inside the lagoons. Data-series were composed by landings per species or group of species. To investigate similarities and/or dissimilarities in seasonal species composition for each lagoon separately, we constructed matrices comprising the percentages of the seasonal composition per year using the Bray-Curtis coefficient [2].

## Results and Discussion

Multivariate analyses of season landing percentages revealed a quite good separation in time for each different lagoon (Figure 1). Hence, two major year-groups were formed consisted, with some exceptions, by the first 20 years of data-series (Group A: 1977-1999, for Mazoma and Tsopeli; 1977-1998 for Pogonitsa; and 1977-1997 for Vathi) and the most recent ones (Group B: 2000-2003 for Mazoma and Tsopeli; 1999-2001 for Pogonitsa; and 1998-2003 for Vathi). In Group A, summer, autumn, and winter were the seasons with the highest contribution representing more than 85% of annual landings in Mazoma, 68% in Tsopeli, 41% in Pogonitsa and 60% in Vathi. In contrast, for Group B in Mazoma and Vathi, landing percentages indicated a different seasonal pattern marked by an increase in spring landing percentages, especially after 2001 (>21% of the total annual landings). Subsequently, in Vathi, season landings, except the autumn ones that have been reduced to almost zero level, showed a high fluctuation of its values: in spring they ranged from 0% to 72%; in summer from 0% to 45%; and in winter from 15% to 100%. However, in Tsopeli and Pogonitsa seasonal alterations in landings were not so evident due to lower spring landings (from 0% to 13% and from 0% to 9%, respectively) compared with the other seasons.

Eventually, despite the close geographic proximity among the four lagoons (<15 km) and the presence of the same fishers cooperation, each lagoon indicated different seasonal landing patterns during recent years (after 1997) than before. This could be attributed to the decline in fishery landings due to the combined effect of anthropogenic impacts both on inland and marine environment (e.g., pollution, overexploitation, absence of fishery regulation) [3] accompanied by the influence of global climatic change [4]. Even though the latter needs a better approach, however, it has been shown that climatic shifts was responsible for the loss of several species [4], a fact that it has been also observed in the studied lagoons (Fish. Dep. of Preveza unbl. data). Moreover, the degradation of lagoon biodiversity impacted on fisher's exploitation tactics. Thus, due to low fish prices during autumn-winter, fishers limited the exploitation and thus, the economic costs, in order to land more fish during spring when the prices

are getting higher. In this context, it is important the existence of artificial deep channels (wintering channels) where fishers could maintain the trapped fish (especially eels, under-sized Mugilidae and *Sparus aurata*) during the cold months (late autumn and winter) and to land the catches in the next harvest season. Consequently, these phenomena had a significant social effect in the general region as fisher's cooperation forced to reduce the number of fishers that worked in the lagoons (from 10, 9, 6 and 5 in 1980, to 5, 4, 4 and 3 after 1999, in Mazoma, Tsopeli, Pogonitsa and Vathi, respectively) in order to limit the economic loss. Concluding, it is evident that the application of an integrated managerial scheme including marine environment (both coastal and inland ecosystems) together with a socio-economic approach could be the primary perspective towards ecosystem sustainability.

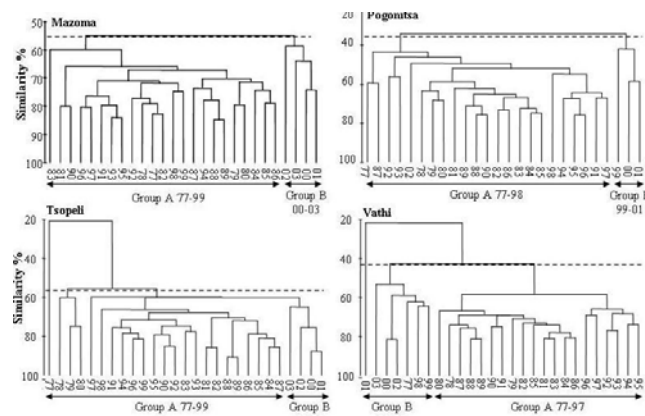


Fig. 1. Dendrogram for group-average clustering based on Bray-Curtis similarities (double-square root transformation) between seasonal species composition per year for the four studied lagoons (Amvrakikos Gulf, 1977-2003).

## References

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