

# IMPACTS OF CAGE FARMING ON THE DISTRIBUTION ON THE MOLLUSCAN FAUNA IN THE AEGEAN SEA

Alper Doğan \*, Mesut Önen and Bilal Öztürk

Ege University, Faculty of Fisheries, Dept. of Hydrobiology, 35100, Bornova, Izmir, Turkey - alper.dogan@ege.edu.tr

## Abstract

The impacts of the cage culture on the Molluscan fauna in the vicinity of fish farms were studied seasonally at 2 stations in the Aegean Sea. A total of 1064 individuals belonging to 129 species were encountered. Relatively low diversity and evenness index values under the cages were determined.

**Keywords :** *Mollusca, Aegean Sea, Aquaculture.*

## Introduction

Over the last two decades, aquaculture activities have rapidly expanded in the coastal marine areas and resulted in decreasing at qualities of sea water and bottom sediment. Similarly, those activities have a continuous conflict with tourism activities. The effects of fish farming on the benthic fauna in the vicinity of fish cages have been reported from several parts of the world as in the Mediterranean [1, 2].

The present study attempts to determine the effects of the fish farming activities on the mollusc fauna inhabiting under and around of the cages of two fish farms.

## Material and Methods

Samplings were performed seasonally at two stations in the Aegean Sea between September 2002 and June 2003 at station 1 and October 2001 and August 2002 at station 2. At each station three samples were taken with dredge; one under the cages, one at the vicinity of the cages and one from reference point where it is far enough from the stress of the organic enrichment. The samples were washed through 0,5 mm mesh size sieve fixed with 10 % formalin and preserved in 70 % ethanol. Data concerning stations and the fish farm are given in Table 1. Diversity, evenness and similarities were determined by means of PRIMER software.

Tab. 1. Data concerning stations and the fish farms. A: under the cages; B: at the vicinity of the cages; C: at a reference site; M: Mud; Ms: Muddy sand; P: *Posidonia oceanica* Delile; Sa: Sand.

Station	Sample	Depth (m)	Biotop	Distance from the cages (m)	Sampling date	Instal. date	Annual production (ton)	Breeding species
1	A	47	Ms	0				
	B	45	Sa	100	09/02-06/03	2002	500	Tuna fish
	C	20	P+Sa	400				
2	A	25	M	0				Sea bass & Sea bream
	B	9	P+Sa	1200	10/01-08/02	1997	500	
	C	14	P+Sa	6000				

## Result and Discussion

In the 24 samples analyzed, a total of 1064 individuals were identified belonging to 129 species. *Bittium latreillii* sampled mainly from the *Posidonia oceanica* meadows was the most abundant species (15,6 %) followed by *Dentalium inequicostatum* (7,99 %) occurred mostly on the muddy bottom of the station 2. *Tellina distorta* considered as a species of semi polluted zone [3] was another abundant species (5,17 %) encountered under the cages having muddy bottom at station 2. *Corbula gibba* considered as tolerant species that can inhabit in semi-polluted or polluted zones where they may form dense populations [4] was sampled relatively less in number under and the vicinity of the cages situated on muddy-sand and sandy bottoms of station 1.

The number of species and the species diversity (H) were lower in the samples collected under the cages while the evenness (J) was relatively constant between the sampling points of the stations. The lowest number of species (27) and diversity value (3,18) were determined under the cages at station 2, whereas the reference point of station 1 was represented with the highest number of species (68) and diversity value (5,37). The maximum numbers of individuals were encountered in the reference points of both stations as 248 at station 1 and 246 at station 2. The lowest number

of individuals (93) was determined at the vicinity of the cages at station 2, and under the cages of station 1 (104).

According to the Bray-Curtis similarity, two stations were linked together with a similarity of 19 % and higher similarity values (49 %, 55 %) were seen in the sub-regions of these two stations (Fig. 1) presumably due to similar bottom structure.

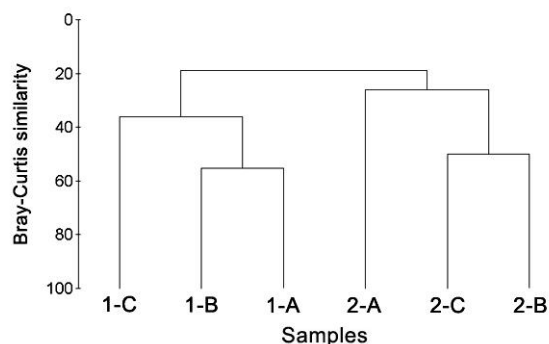


Fig. 1. Bray-Curtis similarity between samples.

The mollusc fauna under the cages especially in station 2 seems to be affected by the earlier installation date of the cages, relatively limited current conditions and shallower depth.

As a result, in order to decrease unfavorable effects of the fish farming activities on the marine ecosystem, the cages should be installed in the locations having appropriate conditions such as depths and strong currents. Beside, certain effects of fish farming on benthic communities can be revealed by more detailed studies including all benthic groups.

## References

- 1 - Karakassis, I., Tsapakis, M., Hatziyanni, E., Papadopoulou, K.-N. and Plaiti W., 2000, Impact of cage farming of fish on the seabed in three Mediterranean coastal areas. *ICES Jour. of Mar. Sci.*, Vol. 57, N: 5, pp. 1462-1471(10).
- 2 - Ergen, Z., Çinar, M. E. and Dağlı, E., 2004, Effects of fish farming on the distribution of polychaetes in the Aegean Sea. *Rapp. Comm. int. Mer Médit.*, 37: 350.
- 3 - Simboura, N. and Zenetos A., 2002, Benthic Indicators to Use in Ecological Quality classification of Mediterranean soft bottom marine ecosystems, including a new Biotic Index. *Mediterranean Marine Science* vol. 3/2, 2002, 77-111.
- 4 - Cihangir, B., Önen, M., Kocataş, A., Ergen, Z., Mater, S., Koray, T., Kayağan, T., Özel, I., Demirkurt, E., Tıraşın, M., Ünlüoğlu, A., Çinar, M. E., Çolak, F., Çoker, T., Öztürk, B. and Doğan, A., 1999, Some Biological Properties of Izmir Bay. - In Orhan Uslu, Mustafa Özerler & Erdem Sayin (ed.), *Ecosystem 1999, Piri Reis Science Series*, No: 2, Izmir, p: 19-48.