

## ACOUSTIC ESTIMATION OF VOLUME AND DISTRIBUTION OF *APHIA MINUTA* (PISCES: GOBIIDAE) IN ALCUDIA BAY (MAJORCA ISLAND, SPAIN)

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A specialized fishery directed at pelagic gobiids is conducted off Majorca island during wintertime. The target species is the transparent goby (*Aphia minuta*, Risso 1810) and by-catch species are *Pseudaphia ferreri* and *Cristallogobius linearis* (IGLESIAS & MARTORELL, 1988). The main catches are taken into the bays; Alcudia Bay is the area where most of the fleet work. The importance of this fishery is due to the local appreciation and high market value of transparent goby.

The fishery is directed at the aggregations that these pelagic gobiids form near the bottom during its reproduction time, being shoals detected with the aid of fish finders. This characteristic allows the use of acoustic methods to determine its localization and abundance.

This study has been the first time that acoustic methods have been used to evaluate *Aphia minuta* abundance and distribution.

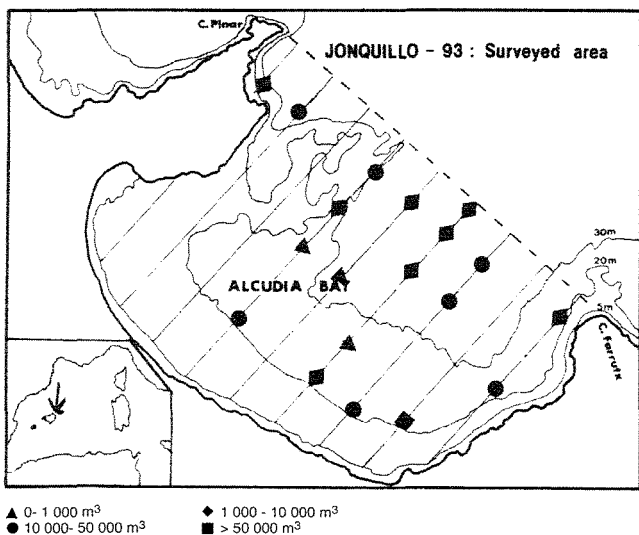
In January 1993, "Jonquillo-93" acoustic survey was carried out on R/V "Xarifa", a 7 m long, 9,9 HP boat, covering the area between Cape Pinar and Cape Farrutx (Alcudia Bay, figure 1). A Skipper 815 paper echosounder with a towed body was used for data collection, using as the log interval one nautical mile. The survey consisted of nine tracks going from 5 meters depth near the coast to the mouth of the Bay (figure 1). The number of nautical miles tracked was 54 and the covered area comprise 47.48 nm<sup>2</sup>. The distance between tracks was one nautical mile.

*Aphia minuta* records on paper echosounder were identified by means of fishermen aid. The scrutinizing of echograms were made by four different groups. Only the coincident readings were considered. The stock size of *Aphia minuta* was estimated by the method of enumeration and volume estimation of shoals recordings (FORBES & NAKKEN, 1972). A simply enumeration of number of shoals by nautical mile give a first relative index of abundance of this species in the area. Since size of shoals is very different, the estimation improves if we consider its volume.

*Aphia minuta* was abundant in January 1993 in Alcudia Bay with a total volume estimate of 12.902.751,44 m<sup>3</sup>. This result agrees with the catches obtained during the fishing period 1992-1993. The distribution of *Aphia minuta* was related to depth and type of substrate, the shoals were concentrated on the center of the Bay where the bottoms are mainly flat rocks and sand. Also this area is characterized by clean waters. Shoals have been detected from 8 to 45 meters depth, being more abundant between 30 and 35 meters depth (65%). Volume of shoals runs from 12,7 - 84077,4 m<sup>3</sup>, with the more abundant volumes between 0-1000 m<sup>3</sup> (60%), followed by volumes between 1000-10000 m<sup>3</sup> (34%), 10000-50000 m<sup>3</sup> (3,4%) and bigger than 50000 m<sup>3</sup> (3%).

The acoustic evaluation of *Aphia minuta* by means of an echosounder has shown to be a valid method to determine its abundance and distribution. Further improvements of the method would require to use an echointegration method and to determine the TS (target strength) value of the species, which may allow to determine number and biomass of the species.

Figure 1. Tracks survey and distribution of *Aphia minuta* in Alcudia Bay in January 1993



### REFERENCES

- FORBES, S.T. & O. NAKKEN, 1972. Manual de métodos para el estudio y la evaluación de los recursos pesqueros. Parte 2. Utilización de instrumentos acústicos para la localización de peces y la estimación de su abundancia. Manual de la FAO de Ciencias Pesqueras n° 5. FIRM/M5.  
IGLESIAS, M. & J.M. MARTORELL, 1998. La pesquería litoral de las Islas Baleares. proyecto cooperativo IEO/CAIB/CEE. XIVB1/87/8/2840. 199 pp.