SMALL-SCALE FISHERIES OF THE ALICANTE GULF: THE CASE OF SANTA POLA PORT AS A PRELIMINARY APPROACH

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Abstract

The artisanal fleet operating in Alicante Gulf was analysed from data collected at the Santa Pola port using, multivariate analysis and GLM. Monthly landings/boat from 1994 to 2002 were used to describe activity groups, identify discriminant species, characterise catch composition by gear and obtain a derived abundance index for selected species. The results suggested that the fishery was more or less stable throughout the years.

Key-Words: Small-scale fisheries, Western Mediterranean, Spain

Introduction

Small-scale fisheries in the Spanish Mediterranean are of limited importance when compared with trawl and purse seine fisheries. Nevertheless, its social and economic importance is high. The artisanal fleet exceeds 2,800 small (< 10 m) boats using more than 20 different gears, usually two or more per boat. It is characterised by highly diversified catches in terms of species as well as by wide geographic dispersion of landings, a fact rendering data collection difficult. In Alicante Gulf, 12 ports with artisanal activity exist, with more than 150 boats landing daily. The Santa Pola port represents more than half of the activity (57% of boats), with more than 300 t landed per year.

Materials and methods

Monthly landings cumulated by boat and species and without gear indication were collected from selected vessels that landed more than 100 days per year in the Santa Pola port during 1994-2002 (compiled by the RIM-IEO). In order to identify different activity groups of the artisanal fleet (i.e., métiers), principal components analysis (PCA) was performed on a matrix containing percentage contribution of 26 species to the total monthly catch by vessel for the period studied. In addition, agglomerative hierarchical grouping (AHG) was applied to identify and classify each monthly-landing (vessels) in each corresponding activity group. The specific composition of the landings of each group obtained were compared with the specific composition of the different gears described previously (1) for a reference year (2000). The comparison allowed us to regroup the results into groups that defined some of the different gears currently used in the area. To analyse the variation of the CPUE for the target species selected in each case a Generalised Linear Model, GLM, (2), which included factors such as vessel, year and month was used. The model chosen was: $\ln\mu_{cym}=\alpha+\delta_c+\theta_y+\lambda_m+\varepsilon_{cym}$, where μ_{cym} is the expected catch rate obtained by vessel class c in year y in month m; α is the catch rate obtained by vessel class 1 in January 1994; δ_c is the efficiency of vessel class c relative to class 1; θ_y is abundance in year y relative to 1994; λ_m is abundance in month m relative to January and ε_{cym} is the deviation between the observed catch rates and the expected value for c. An analysis of deviance was carried out in order to evaluate the significance of the factors in the model. Analyses were performed using S-PLUS 2000 (3).

Results and discussion

The total number of selected boats during the 9-year period was 51 (mean: 25 different boats/year). PCA showed that 6 main components explained 73% of total variance. The 8 most discriminant species (or species groups) identified were: *Mullus spp*., *Merluccius merluccius*, *Octopus spp*., *Sparidae*, *Sepia officinalis*, *Conger conger*, shellfish (*Ruditapes* + *Donax* + *Chamelea*) and mixed 1 (*Sparidae* + *Scorpaenidae* + *Labridae*). Cluster showed 9 main activity groups and subsequent groupings provided 7 different gears. The most discriminant species for PCA also defined the gear grouping, as well as its catch species composition (Table 1). The GLM selected explained up to 48% of deviance for the total CPUE. The most important factors identified were vessel (25%), followed by year (16%) and month (7%). For the species, differences existed between nominal and standardised CPUE's, resulting in standardised ones being lower than nominal ones, especially for *C. conger* and *Sparidae* (Table 2). In general, the fishery was more or less stable with a maximum CPUE in 1997 decreasing slowly thereafter. Selected species were fished all year round, with the exception of *S. officinalis* (fishing season: January to May). In general, the results agree with previous descriptions of the fishery in the area (1), suggesting that the methodology applied can be adequate for use in small-scale fisheries studies.

Table 1. Specific catch composition and percentage contribution of each species/ group to total catch, of the seven main gears identified in the Alicante Gulf area.

Species/Group	Bottom long line	Surface long line	Trammel net	Mullet trammel	Cuttlefish trammel	Hake gillnet	Dredge
C.r conger	13.1	3.5	-	-	-	-	-
C. hippurus	-	1.3	-	-	-	-	-
M. merluccius	-	-	-	-	-	77.7	-
mixed 1	5.3	-	21.4	17.3	13.7	-	1.2
mixed 2	8.8	1.0	6.3	6.7	4.8	4.0	-
mixed 3	8.0	-	4.6	4.4	3.1	1.9	-
Mullus spp	-	-	16.4	42.0	6.1	2.2	-
Octopus spp	6.0	-	21.5	11.8	26.2	-	-
others	20.2	3.7	5.0	4.8	10.4	6.8	3.0
Scomber spp	5.1	-	-	-	-	3.5	-
Scorpainidae	-	-	9.3	4.4	-	-	-
S. officinalis	-	-	10.6	4.8	35.7	-	1.1
S. dumerili	6.9	-	-	-	-	-	-
shellfish	-	-	-	-	-	-	92.7
Sparidae	26.5	1.8	4.9	3.7	-	3.9	2.0
X. gladius	-	88.6	-	-	-	-	-

Table 2. Main characteristics of the more discriminant species identified in the analysis.

Species/ Group	Gear	Nominal CPUE mean ± SD (kg/boat/day)	Standardised CPUE ± SD (kg/boat/day)	Deviance % Explained GLM	Annual Trend	Season	Maximum CPUE
Mullus spp	Mullet trammel	17.69 ± 9.51	14.24 ± 1.04	47.35	Irregular Max.1997 Min.1998	All year	October-November
M. merluccius	Hake gillnet	62.5 ± 32.7	52.11 ± 1.18	65.74	Stable Max.2000 Min.2002	All year; since 1996	May-August
Octopus spp	Trammel net	10.13 ± 10.15	7.32 ± 1.05	54.32	Sinusoidal Max.1995 Min.2002	All Year	January-May
Sparidae	Bottom long line	13.5 ± 12.22	6.51 ± 1.07	36.57	Sinusoidal Max.1997 Min.2001	All Year	April and Autumn
C. conger	Bottom long line	6.61 ± 10.87	1.69 ± 1.12	46.10	Sinusoidal Max.1997 Min.1999	All year	Autumn and Winter
S. officinalis	Cuttlefish trammel	17.8 ± 7.5	14.15 ± 1.12	80.41	Irregular Max.1997 Min.2002	January to May	February

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