THE SMOOTH SCALLOP, *CHLAMYS GLABRA*, FISHERY IN THE GULF OF MANFREDONIA (SOUTH-WESTERN ADRIATIC SEA)

R. Vaccarella*, P. Paparella, G. Bello and G. Marano
Laboratorio di Biologia Marina, Molo Pizzoli, 70123 Bari, Italy

Abstract

The scallop fishery in the Gulf of Manfredonia (south-western Adriatic Sea) is targeted to the capture of smooth and proteus scallops, *Chlamys glabra* and *Chlamys proteus* (Mollusca: Bivalvia: Pectinidae). Presently ten boats are dredging for scallops in a 44.3 km^2 area, from 4 to 16 m of depth; each boat catches 70-80 kg/day of scallops. The analysis of the size frequency distribution of smooth scallops shows that all dredged individuals are older than 1 year and most of them are older than 2 years and have reproduced at least once. The biocoenotic composition of scallop beds was also examined to detect the degree of disturbance by scallop dredging.

Key-words: Bivalves, fisheries, biometrics, Adriatic Sea

Introduction

The smooth and proteus scallops, *Chlamys glabra* (Linnaeus, 1758) and *Chlamys proteus* (Dillwyn, 1817) (Mollusca: Bivalvia: Pectinidae), represent an important shellfish resource in the Gulf of Manfredonia (south-western Adriatic Sea). In this area, *Chlamys* spp. live on chalk weed beds, from 4 to 16 m of depth, and are fished by dredges. The smooth scallop fishery in the Gulf of Manfredonia started in the late '70s. In the years 1981/82 a death mass occurred that almost destroyed the scallop beds of the Gulf and strongly hindered the fishery (1): up to the early '90s only a couple of boats went on occasionally dredging for scallops. In the last four years the density of scallops increased and, consequently, the number of scallops dredgers increased as well.

A preliminary survey in 1994, by experimental hydraulic dredge (66 samples taken along 12 transverses) (Fig.1: area A + area B) showed that the overall *C. glabra* and *C. proteus* biomass was 22.46 ±11.80 metric tons/44.3 km^2 (2). Today, ten boats are fishing for smooth and proteus scallops on the overall area (A + B). Purpose of the present study is to survey the status of scallop beds in the Gulf of Manfredonia by the actual catches of commercial dredging, in order to provide management advise.

Material and methods

In January and February 1997 a preliminary approach to the study was conducted by interviewing the port authorities and scallop dredgers in order to get information on the number of boats actually dredging for scallops, fishing effort, and yields.

In March and April 1997 an experimental fishery campaign was carried out. In the fishing area B (Fig.1), a commercial boat with twin-dredges, 65 HP, was used. The dredge had a rectangular mouth 160 x 30 cm wide and carried a nylon net whose cod end mesh size was 50 mm stretched. The dredge was towed, at about 1.5 knots, from 10 to 30 minutes according to the ground conditions. Thirteen samples were collected; the sampling stations were chosen according to the fisherman knowledge of the best dredgeable zones, in agreement with the purpose of the present survey. The number and weight of scallops caught in each sample were taken. Three samples were used to establish the percentages of commercial shellfish (scallops and other molluscs) and discards.

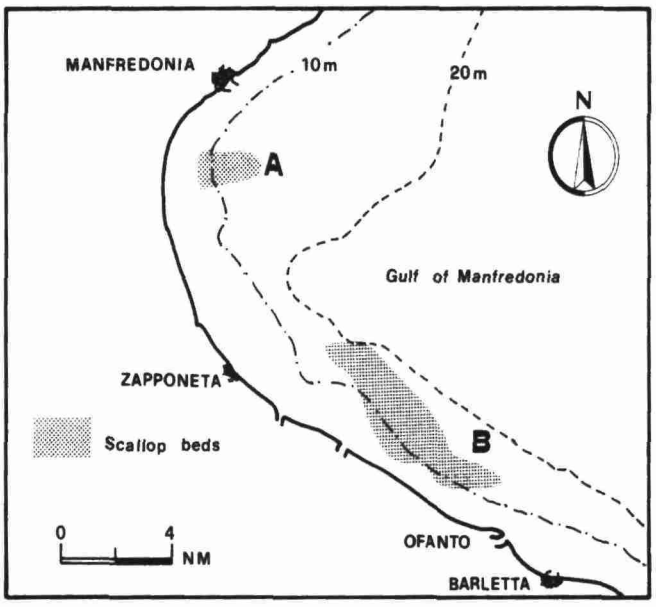

Fig. 1 - The scallop beds in the Gulf of Manfredonia.

A 16 kg subsample of discarded material, randomly chosen from discards of several samples, was fully examined to study the biocoenotic composition. In addition, 952 randomly chosen specimens of *C. glabra* were measured to analyze the frequency distribution of lengths (antero-posterior distance). Another stock of 344 randomly chosen smooth scallops were used for biometrical analysis. The following measures were taken: length, height, width, weight of empty shell, wet weight of autoclave boiled meat and weight of dried meat (oven dehydration at 60°C for 24 hours) (3). The correlation between wet weight of meat and shell length was studied by predictive regression analysis.

Results

The scallop fishery

In the Gulf of Manfredonia fishing for scallops is carried out on an area of about 44.3 km^2, from January to May. Later on in the year scallops become stressed because of their spawning and easily die when caught, hence their commercial value drops down. Presently ten boats, with 2-3 person crew, are involved in this fishery; boat gross tonnage = 4.5-9.4 metric tons; engine power = 36-120 HP. They trawl twin dredges, on bottoms from 12 to 16 m of depth, about 3 nautical miles off the coast. Each dredge, locally called "cassa", is made of an iron rectangular mouth devoid of teeth, weighing 15 kg, carrying a 2.5 m long net; the mesh size is 50 mm stretched. Usually each trawling lasts from 20 to 30 minute, at about 1.5 knots, with the engine running at 1,000 RPM. Scallop fishing is carried out in the morning, 5-6 hours per day.

The average daily catch per boat is 70-80 kg of scallops, mostly *C. glabra*. The wholesale value of scallops is about 5,000 Italian lire/kg (or 2.9 US$/kg). In addition, 160-200 kg of the muricid gastropods *Phyllonotus trunculus* (L., 1758) and *Bolinus brandaris* (L., 1758) are collected. Due to their low value (about 700 Italian lire/kg or 0.4 US$/kg), fishermen discard most of them and usually keep and market some 50 kg of them.

Experimental survey

During the experimental fishing, the average CPUE of scallops was 12.733 kg/h, standard deviation = 3.046. The weight percent composition of caught scallops was

Chlamys glabra	67.42%
Chlamys proteus	29.10%
Pecten jacobaeus	3.20%
Chlamys varia + *Aequipecten opercularis*	0.28%

As shown in the above list, the smooth and proteus scallops make up the bulk of the catch (96.52%). It has to be stressed that all the specimens of the third most important species, *P. jacobaeus* (L., 1758), are juveniles (length range = from 4.1 to 6.1 cm). According to Castagnolo & Aralla (4), *P. jacobaeus* become sexually mature at about 8 cm length. The remaining two scallops, *C. varia* (L., 1758) and *A. opercularis* (L., 1758), are not at all important in this fishery because of their very occasional capture.

The length frequency distribution of smooth scallops is given in Fig. 2. Their size ranges from 2.1 to 4.6 cm; only one specimen was 5.1 cm long. Saracino *et al.* (1) report that the smooth scallop becomes sexually mature and reproduce when 2 years old; the average length at age 1 is 21.85 ± 1.14 mm and the length at age 2 is 31.27 ± 1.63 mm. According to these data, it appears that all the sampled smooth scallops are older than 1 year (age classes 1+ and older). In addition, it can be assumed that virtually all specimens longer than 3.0 cm (as well as many others in the length range 2.3-3.0 cm) are older than 2 years and, hence, have reproduced at least once before being caught (Fig. 2).

Weight of meat is correlated to shell length by the power equation: $W = 0.0446\ L2.729$ (weight in g; length in cm); $r = 0.972$; $p < 0.001$ (Fig. 3). The expected weight at 3 cm length is 0.894 g, *i.e.* 3 times higher than that at 2 cm length, 0.296 g.