

# DIET COMPOSITION OF THE CHUB MACKEREL, *SCOMBER JAPONICUS* (PISCES: SCOMBRIDAE), IN CANDARLI BAY (AEGEAN SEA, TURKEY)

Bahar Bayhan \*, Tuncay Murat Sever and Murat Kaya

Ege University, Faculty of Fisheries Department of Hydrobiology, 35100 Bornova, Izmir-Turkiye - bahar.bayhan@ege.edu.tr

## Abstract

Stomach contents of 223 *Scomber japonicus* specimens collected from Candarli Bay, Aegean Sea (Turkey) have been analyzed. Overall, crustaceans (copepoda and amphipoda) were the most significant prey in terms of IRI%, followed by teleosts and thaliaceans.

**Keywords :** Aegean Sea, Fishes, Diet.

## Introduction

The chub mackerel, *Scomber japonicus* Houttuyn, 1782, is a cosmopolitan species inhabiting the warm and temperate transition waters of the Atlantic, Indian and Pacific oceans, as well as in their adjacent seas [1]. Chub mackerel is a commercially important pelagic species of the Turkey seas.

Because of the worldwide importance of the chub mackerel fishery, several studies have been carried out mainly related to its biology and feeding regime [2, 3, 4, 5]. Quantitative studies on its feeding ecology are scarce in Turkish coast. The biology of *S. japonicus* inhabiting the Sea of Marmara has been studied in [6, 7] and [8] studied the diet composition of juvenile chub mackerel in Izmir Bay (Aegean Sea).

The purpose of the present study is to examine the diet of chub mackerel on the Candarli Bay (Aegean Sea coast of Turkey), with a quantitative determination of the food based on the seasonal analysis of stomach contents.

## Material and Method

*Scomber japonicus* specimens, with total lengths ranging from 13.20 to 25.40 cm, were sampled seasonally during 2005 from commercial purse-seine boats operating in Candarli Bay. Candarli Bay, located between the coordinates 38° 43.8' N - 39° 01.8' N and 26° 32.0' E - 27° 07.2' E (Fig.1), is one of the most important fishing ground in the Aegean Sea. Stomachs were removed immediately from all of the fish after capture and preserved in 4% formalin for later analysis. A stomach was considered empty when the food items in the stomach weighed <0.01 g. Quantitative description of the diet followed [9]. Besides, IRI% was calculated in order to determine ratios of food groups in the stomach to overall food groups.

## Results

The overall diet composition revealed that the chub mackerel fed mainly on crustaceans during all seasons except summer (Table 1).

Tab. 1. Diet composition of chub mackerel from the Aegean Sea during all seasons. (N%: percentage numerical; F%: frequency of occurrence; W%: percentage weight; IRI%: index of relative importance expressed as percentage).

| Prey         | Winter (n=57) |       |       |       | Spring (n=51) |       |       |       |
|--------------|---------------|-------|-------|-------|---------------|-------|-------|-------|
|              | F%            | N%    | W%    | IRI%  | F%            | N%    | W%    | IRI%  |
| Siphonophora | 0.06          | 1.75  | 6.88  | 0.06  | 1.96          | 0.82  | 0.16  | 0.01  |
| Polychaeta   | 0.08          | 5.26  | 0.03  | *     | 1.96          | 0.08  | 0.05  | *     |
| Crustacea    | 94.63         | 70.18 | 23.91 | 41.59 | 70.59         | 91.47 | 86.75 | 62.90 |
| Gastropoda   | *             | *     | *     | *     | 5.88          | 0.37  | 0.13  | 0.01  |
| Cephalopoda  | 0.02          | 1.75  | 0.02  | *     | 1.96          | 0.04  | 5.06  | 0.05  |
| Thaliacea    | 4.74          | 35.09 | 22.87 | 4.84  | 43.1          | 6.72  | 1.28  | 1.73  |
| Teleostei    | 0.47          | 29.82 | 46.29 | 6.97  | 9.80          | 0.49  | 6.56  | 0.35  |
| Prey         | Summer (n=56) |       |       |       | Autumn (n=59) |       |       |       |
|              | F%            | N%    | W%    | IRI%  | F%            | N%    | W%    | IRI%  |
| Siphonophora | 0.91          | 14.29 | 0.31  | 0.09  | 1.51          | 11.86 | 0.10  | 0.10  |
| Polychaeta   | 0.13          | 3.57  | 0.35  | 0.01  | *             | *     | *     | *     |
| Crustacea    | 42.59         | 82.14 | 6.28  | 20.07 | 84.47         | 59.32 | 1.98  | 25.64 |
| Gastropoda   | 0.39          | 5.36  | 0.04  | 0.01  | 0.11          | 1.69  | 0.02  | *     |
| Cephalopoda  | 0.13          | 3.57  | 9.32  | 0.17  | 0.11          | 1.69  | 2.08  | 0.02  |
| Thaliacea    | 51.95         | 76.79 | 24.87 | 29.50 | 8.63          | 18.64 | 0.37  | 0.84  |
| Teleostei    | 3.90          | 51.79 | 58.83 | 16.24 | 5.18          | 49.15 | 95.43 | 24.73 |

Only in summer thaliaceans were the main prey group. Copepods identified from stomachs are given in Table 2. An examination of the previous literature shows that *S. japonicus* is an opportunistic and non-selective species with diet varying according to specimen size, locality, season etc.

Tab. 2. Copepod species identified from chub mackerel stomachs according to seasons.

| Copepoda Species                | Winter | Spring | Summer | Autumn |
|---------------------------------|--------|--------|--------|--------|
|                                 | IRI%   | IRI%   | IRI%   | IRI%   |
| <i>Calanoida</i>                | 5.27   | 10.02  | 4.52   | 12.65  |
| <i>Nannocalanus minor</i>       | 0.01   | 0.22   | *      | *      |
| <i>Temora stylifera</i>         | 0.24   | 4.42   | 0.64   | 2.27   |
| <i>Centropages typicus</i>      | *      | 0.49   | *      | 0.37   |
| <i>Candacia simplex</i>         | *      | 0.42   | *      | 0.15   |
| <i>Acartia clausi</i>           | 0.44   | 5.79   | 0.00   | 1.58   |
| <i>Oncaea media</i>             | 0.02   | 0.13   | 0.13   | 0.82   |
| <i>Sapphirina nigromaculata</i> | 6.97   | 0.25   | 0.01   | 0.45   |
| <i>Farranula rostrata</i>       | 0.41   | 0.19   | 0.37   | 0.36   |
| <i>Euterpina acutifrons</i>     | 0.01   | 0.83   | 0.02   | 2.14   |

\*Prey category present but made up <0.01.

## References

- 1 - Collette B. B., Nauen C. E., 1983. FAO species catalogue. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. *FAO Fisheries Synopsis* no. 125, vol. 2, p. 137.
- 2 - Angelescu V., 1979. Trophic ecology of the mackerel of the Argentine continental shelf. (Scombridae, *Scomber japonicus marplatensis*). Part I. Feeding and growth. *Rev. Investig. Pesq.*, 1: 5-44.
- 3 - Schaefer K.M., 1980. Synopsis of Biological Data on the Chub Mackerel, *Scomber japonicus* Houttuyn, 1782, in the Pacific Ocean, Inter-Amer. Trop. Tuna Comm., *S pec. Rep.*, 2: 395-446.
- 4 - Castro J.J., 1993. Feeding ecology of chub mackerel *Scomber japonicus* in the Canary Islands area. *South Afr. J. Mar. Sci.*, 13: 323-328.
- 5 - Castro J.J., Del Pino, A.S., 1995. Feeding preferences of *Scomber japonicus* in the Canary islands area. *Sci. Mar.*, 59:325-333
- 6 - Tuggac M., 1956. On the biology of the *Scomber colias* Gmelin. *General Fisheries Council for the Mediterranean, Proc.Tech. Pap.*, 4: 145-159.
- 7 - Atli M., 1959. Kolyoz (*Scomber colias* L.)'un biolojisi hakkında [On the biology of chub mackerel (*Scomber colias* L.)]. *Hidrobi. Mecm.*, 5: 125-143.
- 8 - Sever T.M., Bayhan B., Bilecenoğlu M., Mavili S., 2006. Diet composition of the juvenile chub mackerel (*Scomber japonicus*) in The Aegean Sea (Izmir Bay, Turkey). *J. Appl. Ichthyol.*, 22:145-148.
- 9 - Hyslop E. J., 1980. Stomach contents analysis-a review of methods and their application, *J. Fish Biol.*, 17: 411-429.