INSTITUT ZA OCEANOGRAFIJU I RIBARSTVO — SPLIT
SFR JUGOSLAVIJA

No. 75 BILJEŠKE - NOTES 1989

Helminth parasite fauna of *Mullus surmuletus* L. (Pisces, Mullidae) in the Bay of Palermo (Sicily-Italy)

Helmintofauna trlje, *Mullus surmuletus* L. (Pisces, Mullidae), u zaljevu Palermo — Sicilija

N. D. Hristovski,* M. Arculeo,** S. Riggio***

* *Agricultural College, University of Bitola, 97000 Bitola, Yugoslavia.*

** *Istituto di Zootecnica, Università di Reggio Calabria, Reggio Calabria, Italy.*

*** *Istituto di Zoologia, Università di Palermo, Palermo, Italy.*

INTRODUCTION

The Striped mullet, *Mullus surmuletus* L., is quite common commercial fish living in the upper coastal environments of the Mediterranean. It is very close to the congeneric *Mullus barbatus*, from which it differs by well marked morphological features and by the habitat preferences. *Mullus surmuletus* is in fact strictly related to rock and gravels and algal prairies on shallow bottoms in full light, whereas *Mullus barbatus* is collected at greater depths on sandy and muddy plains. The first species is less known as far as its feeding habits and biology are concerned: it is therefore of interest to collect information which can throw some light on the relationship between the species.

The relations host — parasite are a clue to the better understanding of the biological differences underlying more or less distinct taxa (M a y r, 1966). On such an assumption we have examined the parasitic infestation of *Mullus surmuletus* populations living in a limited habitat with highly diverse ecological characteristics. The significance of the data on infestation is further enhanced by comparison with observations of the biological cycles and feeding activities, which point out a strict dependence on the environment.

MATERIAL AND METHODS

Mullus surmuletus was collected in the course of a fishing survey carried out from September, 1981 to August, 1983 in the Bay of Palermo (Sicily) (Fig. 1). Three stations were chosen along the coast of Virgine Maria, in the NW corner of the Bay (Arculeo and Riggio, 1983—1984, 1985). Fishing was performed by night with the use of a standard trammel net at a depth of about

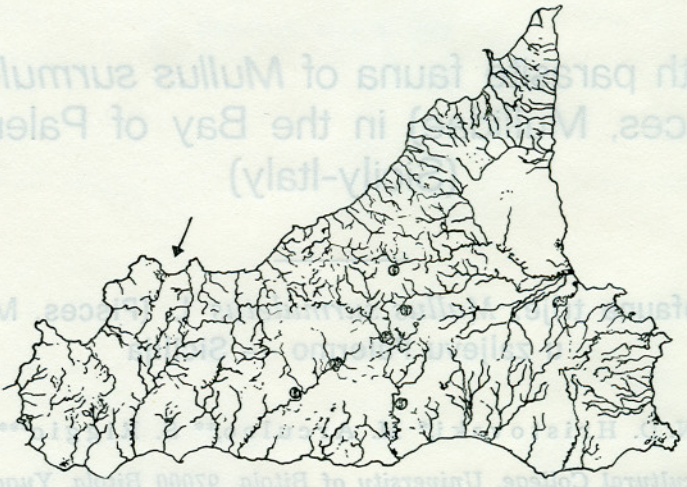

Fig. 1. Hydrological map of Sicily

20 m. Total body length and weight of each specimen were measured. Individuals were dissected and gut contents examined. Parasites living in the intestinal tube were removed and preserved in 80% alcohol. Parasites were identified and counted. The frequency distribution of each parasite species and their relation to the size of the host and time of sampling were investigated.

ECOLOGICAL FEATURES OF THE SITES

The sampling sites were established in a rocky coastal area subject to the outflow of polluted waters from domestic sewers and to the transport and sedimentation of solid wastes from a disposal ground of solid wastes (Costa *et al.*, 1983—1984). They ranged along a coastal stripe of over 2 km in SN direction and were located about 700 m apart from each other. The stations were indicated as TO (Tonnara), DS (Discarica) and TR (Torre).

Station TO was a mixed sandy and rocky bottom affected by domestic sewage and sedimentation but with abundant benthic communities growing on the solid substrata.

Station DS was a steep cliff resulting from a chaotic spreadout of concrete boulders and stones eroded from a nearby ground of solid waste disposal

(Discarica); the solid substrata were covered with a thick carpet of fine sediments and silt which partly smothered the bottom. The algal vegetation was very scanty.

Station TR was a *Posidonia oceanica* bed little affected by silting and pollution and in healthy conditions. Patches of fine sands intermingled with the *Posidonia* »mattes« resulting in a complex and well productive ecosystem.

RESULTS

A total of 232 individuals were dissected and examined; 117 of these showed the presence of parasites. The degree of infestation was therefore 50%.

The distribution of parasitic helminths was the following: *Cucullanus longicollis* was found in 24 individuals; *Hysterothylacium aduncum* was found in 72; *Opecoeloides furcatus* was found in 9 specimens (Table 1).

Table 1. Helminths per locality

Helminths in Mullus surmuletus L.	LOCALITY			
	Tonnara	Discarica	Torre	Total
Hysterothylacium fabri	20	12	42	74
H. fabri (larvae)	1	0	3	4
H. adunctum	2	1	13	16
Cucullanus longicollis	5	5	14	24
Opecoeloides furcatus	2	6	1	9
Total	30	24	73	127
Intestines parasitised hosts	24	26	67	117
Intestines unparasitised	24	33	58	115

Table 2. Helminth fauna of Striped Mullet *Mullus surmuletus* L.

Parasite	% of infestation	Intensity
Cucullanus longicollis	15,9%	1
Hysterothylacium aduncum	10,7%	1
Hysterothylacium fabri	48,2%	1—11
Opecoeloides furcatus	3,88%	1—2

The most frequent species — referred to as the ratio number of parasites per number of guts containing parasites — was *Hysterothylacium fabri* 56.6% followed by *Cucullanus longicollis* 18.9% and *Hysterothylacium adunctum* 12.6%.

The host individuals ranged from 10.5 cm to 19.0 cm in length; the degree of infestation was apparently unrelated to the size of the host. A positive relationship is however evident between the body length and the percent infestation in most frequent size classes (Fig. 2). An increase in the mean degree of infestation was evident in spring and autumn (Fig. 3). *Hysterothylacium fabri* and *Cucullanus longicollis* mostly accounted for this seasonal increase, which was presumably related to the biological cycles of parasites.

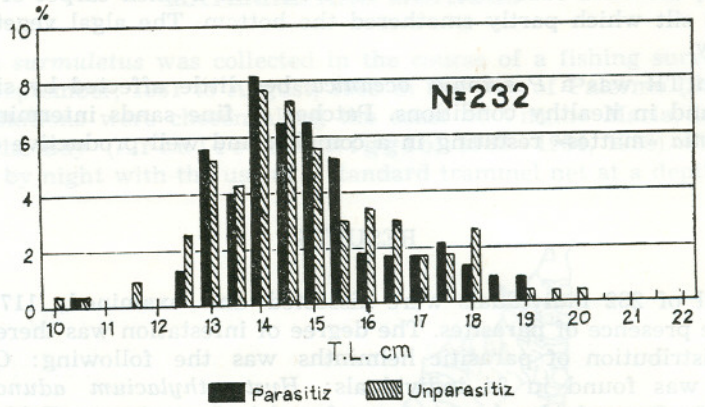

Fig. 2. Size distribution of *Mullus surmuletus*

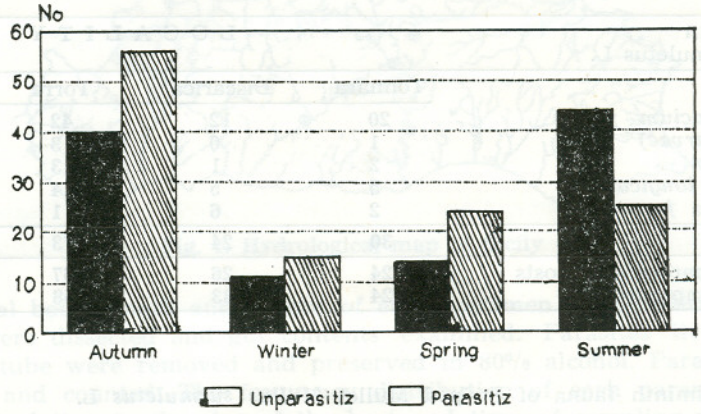

Fig. 3. Degree of infestation in the year

As many as 67 parasited guts, equal to about 53.6% of the entire infestation, found in TR sample, consisted of a *Posidonia oceanica* seagrass-meadow on mixed rocky — sandy bottom. Sample TO collected on a sandy — rocky bottom showed 24 parasitised guts, equal to 50%; 26 guts containing parasites were found in sample DS, from a dumping ground of solid wastes, with a percent frequency of about 44%.

DISCUSION

The results of our examination show quite a high degree of infestation, which is however not uncommon in fish populations of the Mediterranean and Adriatic Sea (Hristovski and Jardas, 1983; Jardas and Hristovski, 1985).

Minor differences among the three stations are evident, which are not relevant due to the high motility of the fish. A comparison of the parasitic faunas and the feeding habits of the hosts, pointed to a possible relationship between the Amphipoda as well as Decapod Crustacea as intermediate hosts of the helminths.

Amphipoda and Decapod Crustacea are in fact the favorite food items of *Mullus surmuletus*, whereas the Molluscs in this particular site are quite rare und can be considered as occasional preys (Arculeo *et al.*, in press). The greater infestation in autumn and spring is presumably related to a greater availability of prey which normally occurs with the transition of seasons.

HELMINTOFAUNA TRLJE, *MULLUS SURMULETUS* L. (PISCES, MULLIDAE), U ZALJEVU PALERMO — SICILIJA

N. D. Hristovski,* M. Arculeo** and S. Riggio***

* *Poljoprivredni fakultet Sveučilišta u Bitoli, Bitola, Jugoslavija*

** *Zootehnički institut Sveučilišta Reggio Calabria, Reggio Calabria, Italija.*

*** *Zoološki institut Sveučilišta u Palermu, Palermo, Italija*

KRATKI SADRŽAJ

Prilikom ispitivanja helmintofaune trlje *Mullus surmuletus* L. iz zaljeva Palermo na Siciliji ustanovili smo slijedeće helminte: *Cucullanus logicollis, Hysterothylacium aduncum, Hysterothylacium fabri* i *Opecoeloides furcatus.* Istraživanja su vršena u razdoblju 1981—1983. god. na tri lokaliteta: Tonara, Tora i Discarica, koji pokazuju različita ekološka svojstva uzduž priobalnog pojasa, na dubini od 20 m, u oblasti Virginia Maria u sjeverozapadnom dijelu zaljeva.

REFERENCES

Arculeo, M. e S. Riggio. 1983—84. Dati preliminari sulla piccola pesca nel Golfo di Palermo. Nova Thalassia, 6: p 725.

Arculeo, M. et S. Riggio. 1985. Situation et pérrspective de la peche cotière dans une localité du Golfe de Palermè apres deux ans d'observations. FAO Rapp. Pêches, 336: 140, annex F 45—50.

Arculeo, M., C. Pipitone e S. Riggio. (in press). Aspetti del regime alimentare di *Mullus surmuletus* L. (Pisces: Mullidae) nel Golfo di Palermo.

Costa, C., S. Riggio e G. Giaccone. 1983—84. Note binomiche sulle comunità di substrati naturali ed artificali lungo la Costa di Vergine Maria (Golfo di Palermo). Nova Thalassia, 6: 663—669.

Hristovski, N. D. and I. Jardas. 1983. A contribution to the knowledge of the helminth fauna of fishes from the coastal waters of the Mid-Dalmatian insular area of the Adriatic Sea. Acta Adriat., 24: 179—191.

Jardas, I. and N. D. Hristovski. 1985. A new contribution to the knowledge of helminth parasite fauna of fishes from the chanells between the Mid-Dalmatian islands, Adriatic Sea. Acta Adriat., 26: 145—164.

Mayr, E. 1966. Animal Species and Evolution. Cambridge, 591 pp.

Received: May 8, 1989.