

THE FIRST RECORD OF BLUEFISH FINGERLING, *POMATOMUS SALTATOR* (LINNAEUS, 1766)
(PISCES : POMATOMIDAE) IN THE SOUTHEASTERN ADRIATIC SEA

V. Kozul*, P. Tutman, N. Glavic, B. Glamuzina and B. Skaramuca

Laboratory of Ecology and Aquaculture, Institute of Oceanography and Fisheries, Dubrovnik, Croatia - kozul@labdu.izor.hr

Abstract

Bluefish are a rare species in the Adriatic. We captured the first fingerling specimens of this species in the Gornji Molunat Bay along the eastern shores of the Adriatic. The paper describes the morphological and meristic measurement features of captured specimens. Considering that this species is found in tropical and subtropical seas, the captured fingerlings point towards the possibility of their spawning and greater expansion in northern Adriatic waters.

Keywords : biometrics, biodiversity, Adriatic sea

Introduction

The bluefish (*Pomatomus saltator*, Linnaeus 1766) belong to the family of Pomatomidae. It inhabits tropical and subtropical seas, and is widespread throughout the entire Mediterranean, but it is rare in the Adriatic (1). This species is rarely caught in the waters of Dubrovnik, usually up to 20 adult specimens and most frequently during late summer and autumn (Kozul, unpublished data). Up until now, no data has been published on the biological and ecological characteristics of this species in the eastern Adriatic. This paper gives the first data on bluefish fingerling, and their morphological and meristic features.

Material and methods

Bluefish fingerlings were captured at the beginning of November 2000. The specimens were identified using the taxonomical key given by Soljan (2) and Jardas (1) (Figure 1). Two fingerling specimens were captured using a modified drag-net in the Gornji Molunat Bay (18°26'E, 42°27'N). During the sampling, the temperature was 19.6 C, the salinity was 36.9 ‰ and the oxygen was 7.71 mg/l. This is a sandy and shallow bay located on the eastern shore of the southern Adriatic, 17 n/m southeast of Dubrovnik. The surface of the bay is 2 km² and it is exposed to the southern winds characteristic of the southern Adriatic (3). The net used to catch the fingerlings was 50 m in length and 5 m in height in the middle, with a central bag. The diameter of the netting on the outside wings of the net was 8 mm, and in the central area of the net it was 4 mm. The net was dragged from the bay's entrance up to its end at a work depth of 0-4 m. The captured fish specimens were preserved in a 4% formaldehyde solution in preparation for laboratory work. In the laboratory, the total and standard lengths were measured with a precision of 0.1 mm, and the weight was measured with a precision of 0.01 g. The biometric measurements were taken in mm. The meristical characteristics contained ray fins in the dorsal, anal, pectoral and caudal fins. A decrease in length caused by formaldehyde preservation depends upon the initial specimen length and duration of preservation. An average of 5% is lost on total larvae and fingerling length due to formalin storage (4).

Results and discussion

Table 1 shows the dimensions (in mm) and the meristic measurements of captured fingerlings. The fingerlings had pronounced, sharp, conical teeth bent slightly backwards in both jaws, the second dorsal and anal fins were of equal length, and the belly and chest fins were also of almost equal length. There were no scales on either of the two specimens. A dark green to black color covered the top of the head and top of the back, while the bottom of the head and abdomen varied from silver to white.

No examples have been noted of bluefish fingerling in the Adriatic up until now, and according to Jardas (1) this species is infrequent in the Adriatic. Taking into consideration that the fingerlings were captured in early November 2000, and that this species spawns during spring and summer (1), we can conclude that bluefish also spawn in the southern Adriatic. The significant movement of bluefish noted towards northern Portuguese waters by Quero (5), as is the case with the Adriatic Sea. In recent years, more fish species that do not belong to the Adriatic are being caught, such as the white grouper *Epinephelus aeneus* (6). Besides this, we can now find species that were once characteristic of only southern Adriatic waters in the central and northern regions of the Adriatic. The dusky grouper (*Epinephelus marginatus*) is spreading northwards from the southern and central Adriatic (7). Usually, it concerns species that are tropical or subtropical. Along with adult specimens, pompano fingerling (*Trachinotus ovatus*) specimens were also caught (8). Some Mediterranean species that lived only in the southern Adriatic are now being caught in the north as well, *Trachypterus trachypterus*, *Epinephelus marginatus*, *Choryphaena hippurus*, *Plectorhinchus mediterraneus* and *Balistes carolinensis* (9). The same is happening with the amberjack (*Seriola dumerili*), which reached the central Adriatic 5-6 years ago. Now, adult and juvenile specimens are being caught in the northern Adriatic, while amberjack numbers in the tra-

ditional hunting grounds of the southern Adriatic have decreased significantly (Kožul, unpublished data). The arrival of new species can affect the ecological conditions of our sea, or can endanger and push out autochthonous species. Greater attention should be paid to such occurrences as they have been growing increasingly frequent over recent years, and this could be a reflection of general climatic changes.

Table 1. Morphometric (in mm) and meristic data of bluefish fingerling, caught in the south eastern Adriatic

Fing.	I	II		I	II	
Total length	47.2	50.1	Body depth (max)	11.4	13.4	
Standard length	37.3	43.3	Body depth (min)	6.1	5.3	
Fork length	40.1	45.2	Head length	14.0	15.5	
Predorsal length	17.5	17.5	Ocular diameter (horiz.)	4.5	5.3	
Preanal length	24.3	28.4	Interorbital width	5.0	5.5	
Preventral length	13.5	17.7	Preorbital length	4.5	5.3	
Prepectoral length	17.2	15.5	Dorsal fin rays D1	VIII	VIII	
Dorsal fin length D1	8.0	9.2	D2	I+2z	I+26	
	D2	10.1	10.5	Anal fin rays	II+24	II+25
Anal fin length	11.5	11.5	Pectoral fin rays	17	17	
Pectoral fin length	8.2	8.7	Ventral fin rays	I+5	I+5	
Ventral fin length	5.1	5.3	Caudal fin rays	28	28	
Caudal fin length	10.2	11.3				

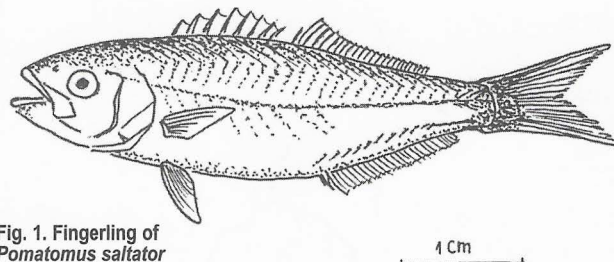


Fig. 1. Fingerling of *Pomatomus saltator*

References

- Jardas, I. 1996 *Jadranska ihtiofauna / Jasna Matekalo Draganović (ur.)*. Zagreb : Skolska knjiga Zagreb.
- Soljan, T., 1975. *I pesci dell' Adriatico*. Officine graficedi Verona, 522 pp.
- Skaramuca, B. Kristic, Zi V. Kozul, 1997. *Visegodisnje kretanje ulova ribe gof (Seriola dumerili, Risso) u donjoj uvali Molunat, juzni Jadran, Tisucu godina prvoga spomena ribarstva u Hrvata, HAZU, Zagreb, 629-636.*
- Mc Gurk, M.D. 1984. Ring deposition in the otoliths of larval Pacific herring, *Clupea harengus pallasii*. *Fish. Bull.* 82 : 113-120.
- Quero JC. 1998. Changes in the Euro-Atlantic fish specimens composition resulting from fishing and ocean warming. *Italian Journal Zoology*. 65 : 493-499.
- Glamuzina, B; Tutman, P; Geffen, J.A; Kozul, V; Skaramuca B. 2000. Premier signalement du mérou blanc, *Epinephelus aeneus* (Serranidae) dans le mid-est de l'Adriatique. // *Cybium*. 24 (3) 306-308.
- Glamuzina, B and Skaramuca, B. A review : 1999 Adriatic groupers - Status of natural populations and breeding perspectives. *Acta Adriatica*. 40, Supplement; 79-90.
- Dulcic, J ; Pallaoro, A ; Kraljevic, M. 1997 First record of pompano fingerling, *Trachinotus ovatus* (Linnaeus, 1758) (Pisces : Carangidae), in the eastern middle Adriatic. *Natura Croatica*. 6 (1) 61-65.
- Dulcic, J and Lipej, L. 1997. New records of marine fishes from the Slovenian coastal waters. *Falco*. 12 : 35-40.