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FIRST RECORD OF THE DOLPHIN-FISH JUVENILES, *CORYPHAENA HIPPURUS* (LINNAEUS, 1758), IN THE EASTERN ADRIATIC SEA

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ABSTRACT

Two juvenile specimens of Coryphaena hippurus *have been found in the Adriatic for the first time. Prior to this, larval stages were also encountered in the Adriatic which, along with findings of the juveniles, might indicate that* C. hippurus *reproduces in these waters. In the last few years, records of larval and juvenile stages of the species that were previously rare or relatively rare in the area became more common.*

Key words: *Coryphaena hippurus*, juvenile fish, Adriatic Sea

PRIMA SEGNALAZIONE DI STADI GIOVANILI DI LAMPUGA, *CORYPHAENA HIPPURUS* (LINNAEUS, 1758), IN ADRIATICO ORIENTALE

SINTESI

Due esemplari giovanili di Coryphaena hippurus *sono stati trovati per la prima volta nel mare Adriatico. Prima di tale cattura, anche stadi larvali sono stati rinvenuti nel mare Adriatico il che, assieme al ritrovo di stadi giovanili, potrebbe indicare che* C. hippurus *si riproduce in tali acque. Negli ultimi anni, catture di stadi larvali e giovanili di specie in precedenza considerate rare o relativamente rare nell'area, sono diventate più frequenti.*

Parole chiave: *Coryphaena hippurus*, stadio giovanile, mare Adriatico

INTRODUCTION

The dolphin-fish, *Coryphaena hippurus* (Linnaeus, 1758) is an epipelagic cosmopolitan species inhabiting open waters but also approaching the coast. It is a highly migratory species distributed throughout tropical and subtropical waters including the Atlantic, Pacific and Indian Oceans (Palko *et al.*, 1982). It is also distributed in the Mediterranean Sea, but is more abundant in its western part where it occurs seasonally from May-June to December (Massuti & Morales-Nin, 1997). This species is also present in the Adriatic Sea where it was considered relatively rare (Jardas, 1996). However, in the recent years it became more common and during the summer months it appears in significant abundance. This suggests that it should be treated as a common species at least seasonally, especially in the southern part of the Adriatic (Dulčić & Lipej, 2002). Although *C. hippurus* is not a target species of commercial fisheries in the Adriatic, probably because of its seasonality and relatively low market price, recreational fishermen take advantage of its presence in the summer months.

There is a great scarcity of published information on biology and ecology of *C. hippurus* in the Adriatic. In fact, except for one paper about the presence of the larval stages of *C. hippurus* in the Adriatic by Dulčić (1999), no other data is available. The aim of this paper is to present the first records of the juvenile stages of this species in the Adriatic with its biometric and meristic characteristics, and to improve knowledge about this species in the area.

MATERIAL AND METHODS

One *Coryphaena hippurus* juvenile was found swimming inside a floating bucket in the open sea in the Adriatic on 29 July 2008, about 12 miles south of the Biševo Island (Fig. 1, location 1). The other specimen was found free swimming close to the sea surface on 5 July 2003 near the south-east side of the Biševo Island (Veli Žardin cove) (Fig. 1, location 2) and was caught by a hand net. Both specimens were identified according to the taxonomic key by Jardas (1996), preserved in 4% formalin and deposited in the ichthyological collection of the Institute of Oceanography and Fisheries (IOR-313).

Total and standard length and biometric measurements of the specimens were measured to the nearest mm, while the weight of the fish to the nearest 0.01 g. Meristic characteristics of dorsal, anal, pectoral and caudal fin rays were also taken.

RESULTS AND DISCUSSION

Biometric and meristic data of the specimens of *Coryphaena hippurus* are presented in Table 1 and are in agreement with those provided by Palko *et al.* (1982).

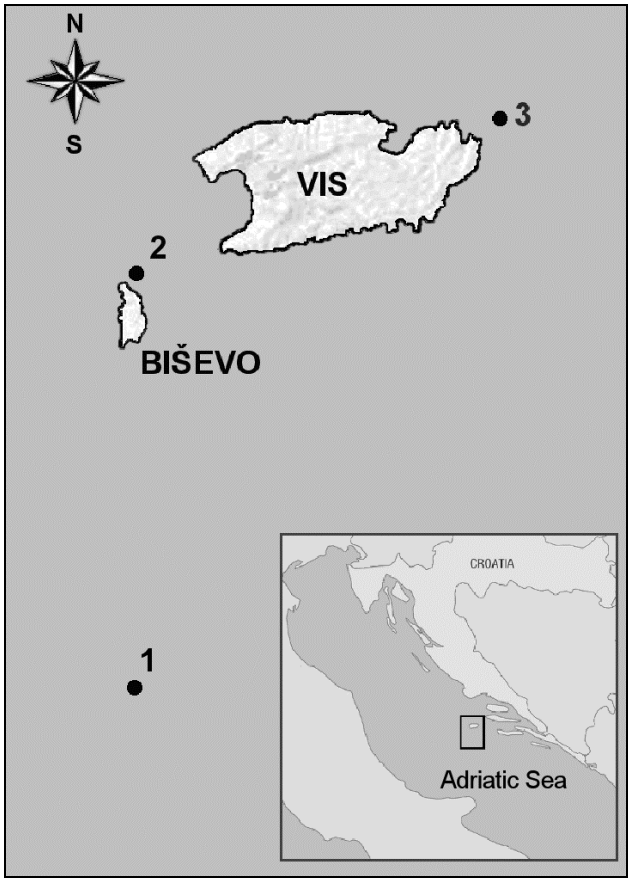

Fig. 1: Locations of the occurence of early life stages of** Coryphaena hippurus **in the Adriatic Sea. See text for details.
Sl. 1: Lokacije pojavljanj zgodnji življenjskih faz** Coryphaena hippurus **v Jadranskem morju. Za podrobnosti glej besedilo.

The larger specimen (Fig. 2), caught in 2008, was 13.0 cm TL and weighted 12.22 g, while the smaller specimen (Fig. 2), caught in 2003, was 4.7 cm TL and weighted 0.75 g. It is interesting to note that the larger specimen was found swimming inside a floating bucket. This can be explained by the fact that these fish can often be associated with various floating objects. It is possible that this individual was probably swimming under the object, but was somehow trapped inside.

The body of both juvenile *C. hippurus* was elongated and compressed and the height of the head was not as pronounced as in the adult fish. The colour of the smaller specimen was brown, with 15-16 vertical bars across the flanks, while the colour of the larger specimen was dark gray, with silvery flanks. Along the flanks, close to the dorsal fin of the larger specimen, 14 white dots were noticed, but they were visible only while the fish was still fresh. The dots became unnoticeable after the fish was placed in formalin. Pelvic, dorsal and anal

Tab. 1: Morphometric and meristic properties of *Coryphaena hippurus* ***juveniles. All measurements are given in centimeters.***
Tab. 1: Morfometrični in meristični podatki mladostnih primerkov *Coryphaena hippurus*. ***Vse meritve so podane v centimetrih.***

Morphometric parameter	*C. hippurus* 1	*C. hippurus* 2
Total length	13.0	4.7
Standard length	11.1	3.9
Fork length	11.5	4.5
Predorsal length	1.7	0.8
Preanal length	5.9	2.2
Preventral length	2.7	1.1
Prepectoral length	2.5	1.0
Dorsal fin length	8.8	2.9
Anal fin length	4.2	1.5
Pectoral fin length	1.6	0.7
Ventral fin length	2.0	1.0
Caudal fin length	2.2	0.8
Maximum body depth	2.1	0.9
Minimum body depth	0.6	0.3
Head length	2.7	1.1
Ocular diameter	0.7	0.4
Interorbital width	0.8	0.3
Preorbital length	0.7	0.2
Meristic parameter		
Dorsal fin rays	Damaged	50
Anal fin rays	Damaged	23
Pectoral fin rays	20	21
Ventral fin rays	I + 5	I + 5
Caudal fin rays	Damaged	20

Fig. 2: Juvenile specimens of *C. hippurus* ***from the Adriatic Sea.***
Sl. 2: Mladostna primerka *C. hippurus* ***iz Jadranskega morja.***

fins were black, while the pectoral ones were white. Tips of the caudal fin were white in both specimens, while the rest of the fin was brown.

The presence of the juvenile stages of *C. hippurus* in the Adriatic Sea is of particular interest, since it indicates a possibility that this species reproduces in the Adriatic. This presumption can also be supported by the findings of larvae by Dulčić (1999). However, the possibility that fertilized eggs and larval stages of this pelagic species have been drifted to the Vis and Biševo area from southern areas by the sea currents cannot be excluded. This hypothesis could be explained by the Adriatic ingressions, a well documented phenomenon of intensified influx of Ionian waters into the Adriatic Sea (see Grbec *et al.*, 1998). Moreover, it seems that ingressions might represent a suitable explanation for unusual presence of various thermophillic fishes in the Adriatic Sea, but such conclusion should be supported by future research.

Both juvenile specimens were found near the Biševo Island in July, while Dulčić (1999) found two *C. hippurus* larvae (4.75 and 4.95 mm SL) in the vicinity of the Vis Island in August (Fig. 1, location 3). This suggests that the actual spawning takes place in the period from June to August which is corroborated by the fact that the period of spawning in the western Mediterranean is from June to July (Massuti & Morales-Nin, 1997).

Since *C. hippurus* is exploited mostly in the western and central part of the Mediterranean, information concerning biology and distribution of this species are limited to that area. This species is target of offshore local fishermen around the Balearic Islands, Tunisia, Sicily and the Maltese Islands where it seasonally occurs in great abundance (Castriota *et al*., 2007). The first record of larval stages of *C. hippurus* in the Mediterranean Sea was reported by Alemany & Massuti (1998) for the area off the Balearic Islands, but there is still a great scarcity of information about the presence and distribution of this species in the eastern Mediterranean.

In the last few years, records of larval and juvenile stages of the species that were previously rare or relatively rare in the Adriatic Sea became more common. Findings of early life stages of species like *Balistes carolinensis, Trachinotus ovatus* and *Trachipterus trachypterus* could be a consequence of new climatological and oceanographical conditions in the Adriatic as well as in the Mediterranean Sea. These new conditions are probably a key for the increased abundance of *C. hippurus* in the Adriatic Sea in the recent years. Prior to these new findings, including larvae found by Dulčić (1999), there were no findings of such early life stages of this species in the Adriatic Sea, therefore, it is reasonable to conclude that its reproduction in the Adriatic is a recent adaptation to a new and changing environment.

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PRVI PODATKI O MLADOSTNIH PRIMERKIH DELFINKE *CORYPHAENA HIPPURUS* (LINNAEUS, 1758) V VZHODNEM JADRANSKEM MORJU

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POVZETEK

Prvič sta bila v Jadranskem morju najdena dva mladostna primerka vrste Coryphaena hippurus. *Dejstvo, da so bile pred tem v Jadranu opažene larve te vrste, skupaj z najdbo mladostnih primerkov nakazuje na možnost, da se* C. hippurus *razmnožuje v teh vodah. V zadnjih nekaj letih so podatki o larvah in mladostnih primerkih vrste, ki so bili pred tem redki oz. relativno redki, vse pogostejši.*

Ključne besede: *Coryphaena hippurus,* mladostni primerki, Jadransko morje

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