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On the presence of a well-established population of *Symphodus melops* (Linnaeus, 1758) in the central Mediterranean Sea with notes on its habitat and ecology

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The presence of a well-established population of the corkwing wrasse, Symphodus melops *(Linnaeus, 1758), is reported for the first time from the central Mediterranean Sea (southwestern Sicily). We discuss about the presence of the species in the area, with notes on its habitat, ecology and distribution.*

Key words*:* Labridae, Strait of Sicily, Mediterranean Sea, uncommon species, new record

INTRODUCTION

The family Labridae, with more than 500 described species, is one of the largest and most morphologically and ecologically diversified fish families in the world (PARENTI & RANDALL, 2000; HANEL *et al*., 2002; NELSON, 2006). Labrids are common shallow-water species and occur in a great variety of habitats (sand and rock, sand, coral reefs, rocky reefs, seagrass and seaweed beds) throughout tropical, subtropical and temperate marine waters of the world (CARPENTER & NIEM, 2001). Protogyny, in which a specimen begins reproductive life as female and then later may switch to male, is the most common reproductive strategy among Labridae (WARNER, 1975). *Symphodus melops* (Linnaeus, 1758), commonly known as corkwing wrasse, is a northeast Atlantic species known from Norway to northern Morocco, including the Baltic Sea, UK, Ireland and Azores Islands. It is also reported from the western and central Mediterranean Sea (QUIGNARD & PRAS, 1986; FISCHER *et al*., 1987; LANFRANCO, 1996). Other records come from the Adriatic and the Aegean Seas (BILECENOGLU *et al*., 2014). This species is similar in morphology, color and size to *Symphodus roissali*, from which it can be distinguished by the presence of a bean-like dark spot behind the eye (COSTA, 1991). Adult males show brighter colors than females and are nest builders (COSTA, 1991); during the breeding season, they show irregular blue and orange lines on the head and irregular spots of the same colors (more or less marked) on body and fins (with the exception of the pectoral fins). Mature females show a dark blue

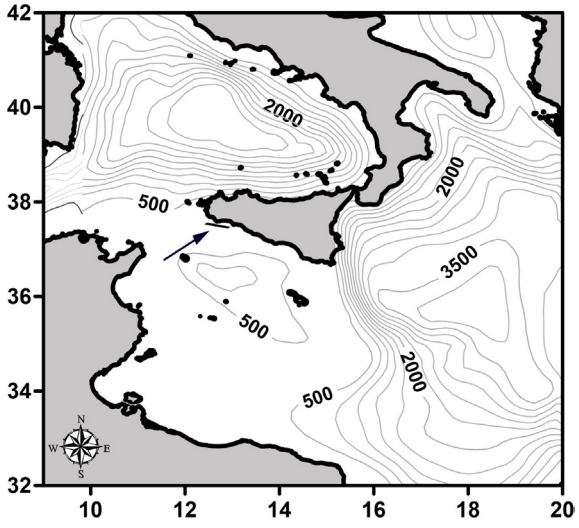

Fig. 1. The black line (indicated by the arrow) indicates the study area in the central Mediterranean Sea (southwestern coast of Sicily)

urogenital papilla. In Italy (and, in general, in the Mediterranean Sea), where the species is considered rare and never abundant, no targeted studies have been carried out yet to better understand the ecology and factors affecting the distribution and abundance of the species. Here we report the presence of a well-established population of *S. melops* along the southwestern coast of Sicily, providing the first records of the species in the area, and notes about its habitat, ecology and distribution.

MATERIAL AND METHODS

The specimens of *S. melops* were observed during SCUBA dives at six localities along the southwestern coast of Sicily, in the area extending from Mazara del Vallo to Sciacca, for about 50 Km of coastline (Fig. 1): Capo Feto (37.65756 N, 12.53819 E), Capo Granitola (37.58233 N, 12.64684 E), Capo San Marco (37.49884 N, 13.01500 E and 37.49967 N, 13.01122 E), Contrada Foggia (37.49701 N, 13.04389 E) and Sovareto (37.49991 N, 13.10720 E).

All observations were made in 2017, from March to October. A total of 10 SCUBA dives were carried out at depths ranging from 0 to 20 m. For each observation of the species, we registered the following data: number of specimens, habitat, depth and other fish species present in the same habitat. Several specimens were photographed (Fig. 2) in order to show the live coloration of *S. melops*.

RESULTS AND DISCUSSION

With the exception of a single specimen observed at less than 1 meter depth among boulders, small groups of 5–6 specimens of different size and sex (Fig. 2A-D) of *S. melops* were observed at each dive in all the localities. All specimens were observed between 0.5 and 10 m depth, among blocks of the pier and over mixed bottoms (sand and rocks) near *Posidonia oceanica* (Linnaeus) Delile meadows. At Capo San Marco, *S. melops* specimens were observed more frequently swimming with other *Symphodus* species (*Symphodus tinca* and *Symphodus roissali*) (Fig. 2F). In this location, the species was also observed sharing crevices with *S. tinca*. In three cases, it was observed the cleaning interaction between the cleaner wrasse (*Symphodus melanocercus*) and *S. melops* (Fig. 2E). *Symphodus melops*, compared to the other *Symphodus* species present in the area, is not easy to approach and tend to swim away quite fast from divers. From our observations, it can be suggested that *S. melops* prefers very shallow waters (from 0.5 m to about 10 m depth), among boulders of the pier and over mixed bottoms (sand and rocks), near *P. oceanica* meadows. In these habitats, in almost all cases, this gregarious species was observed in small groups of 5-6 specimens of different size and sex, often swimming or interacting with other *Symphodus* species, such as *S. roissali*, *S. tinca* and *S. melanocercus*. In late spring, mature males were observed building their nests of seaweed among rocks. *Symphodus melops* appears to be a species that tends to swim away when approached by divers. This, together with the fact that the species can be easily confused and misidentified by non-experts with *S. roissali* (and probably with other similar species, such as *S. tinca*), could lead to the underestimation of presence and abundance of *S. melops*. In the area of study, the presence of the species was first recorded by

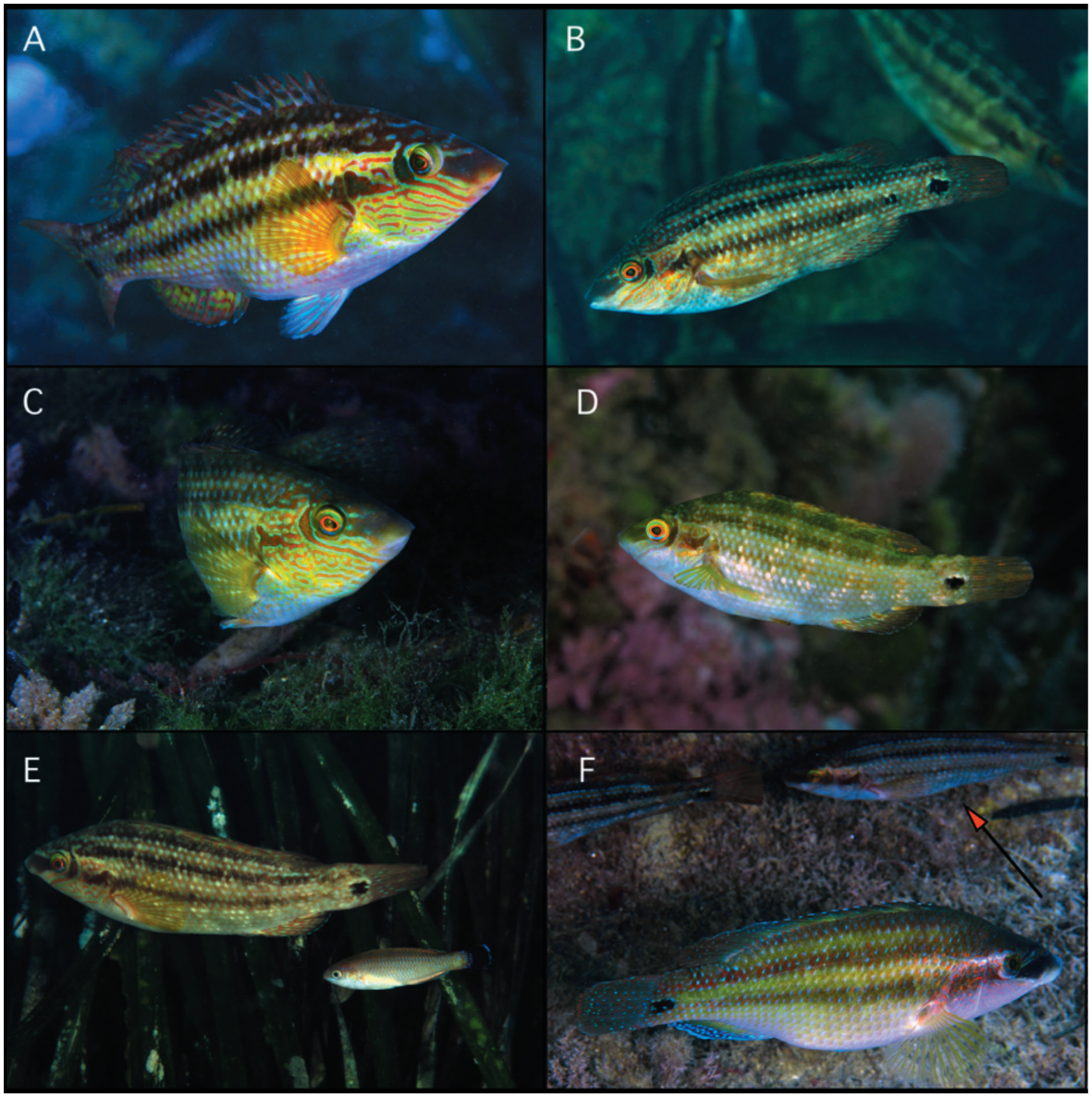

Fig. 2. Some of the specimens of Symphodus melops *photographed in the study area; adult male (**A**); adult female (**B**); particular of the head of an adult specimen (**C**); juvenile specimen (**D**);* S. melops *(above) and* S. melanocercus *(below) (**E**);* S. tinca *(in the foreground) and* S. melops *(in the background, see the red arrow) (**F**)*

us about 10 years ago; while, surveys conducted by us over the last 10 years in similar habitats of other southern Italian locations, in the Ionian (e.g., Marzamemi, Avola, Siracusa, Catania, Crotone) and Tyrrhenian Seas (e.g., Palermo, Milazzo, Scilla, Sorrento), did not show the presence of the species. Hence, considering all the above data, we can assert that the species is quite common and well-established along the southwestern Sicilian coast examined in this study; while, in other Italian Seas, with the exception of the Adriatic Sea (in particular the northern part) (FROESE & PAULY, 2018), *S. melops* currently appears to be generally rare. However, recently, the species was observed and photographically documented in the northern Tyrrhenian Sea (Baruffa, pers. comm.): San Felice Circeo - a specimen was observed on 31th August 2015, at a depth of 1 meter, on rocky bottom; Anzio - four specimens were observed on 11th November 2018, at a depth of 0.5 meter, on mixed bottom, rock (both natural and artifi-

cial) and sand; Santa Marinella – a mature male specimen was observed during nest building on 20th April 2018, at a depth of 2 meters, on rocky bottom. Considering that *S. melops* is native to the northeast Atlantic, ranging from Morocco to Norway, in the North Sea (ROBALO *et al*., 2012; FROESE & PAULY, 2018), and that the waters along the southwestern coast of Sicily are generally colder than those of the other investigated areas of the Ionian and Tyrrhenian Seas (FALCINI *et al*., 2015), the presence and abundance of the species in the study area could be explained, at least in part, by hydrological conditions, temperature in particular. However, other environmental factors could not be ruled out. In conclusion, we provide the first data supporting the presence of a well-established population of *S. melops* in the southern Sicily (first records in the area), with notes about its habitat, ecology and distribution. This represents the first report in which the species is reported as common and relatively abundant in Italian waters (and, in general, in the Mediterranean Sea). Further targeted and extensive studies are necessary to better understand the ecology, distribution and abundance of *S. melops* in the Mediterranean Sea and factors affecting its establishment.

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O prisutnosti uspostavljene populacije kosirice mjesečice, *Symphodus melops* (Linnaeus, 1758), u središnjem Sredozemnom moru s bilješkama o njezinom staništu i ekologiji

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SAŽETAK

U ovom radu se navodi prisutnost utemeljene populacije kosirice mjesečice *Symphodus melops* (Linneus, 1758) koja je prvi put zabilježena u središnjem Sredozemnom moru (jugozapadna Sicilija). Autori iznose podatke o pristunosti vrste u tom području zajedno s bilješkama o njezinom staništu, ekologiji i distribuciji.

Ključne riječi: Labridae, Sicilijanski tjesnac, Sredozemno more, neuobičajene vrste, novi nalaz