

FIRST RECORDS OF *DIDOGOBIUS SPLECHTNAI* ALONG THE FRENCH MEDITERRANEAN COAST AND ADDITIONAL COMMENTS ABOUT *D. SCHLIEWENI*

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Abstract. This paper reports new records of *Didogobius splechnai* Ahnelt et Patzner, 1995 along the French Mediterranean coast. Additional comments on older underwater observations of *D. schlieveni* Miller, 1993 are also provided. The status of rarity of these two species is discussed. *D. splechnai* is probably regularly distributed in the north-western and eastern Mediterranean where suitable habitats are available but both species are considered as rare (*D. splechnai*) to very rare (*D. schlieveni*).

Keywords: *Didogobius splechnai*, *Didogobius schlieveni*, new records, France, distribution, rare species

Former findings from Mediterranean Sea: *Didogobius splechnai* Ahnelt et Patzner, 1995 was described from seven specimens collected in caves of the Balearic island of Ibiza (Spain, north-western Mediterranean) at depths of 4 to 11 m (Ahnelt and Patzner 1995). Subsequently Patzner (1999) recorded this fish from the depth range of 7 to 20 m. *D. splechnai* has since been recorded at: (1) Cala Calandra, on the island of Lampedusa at the depth of 4.5 m (Italy, central Mediterranean; Stefanni 1999); (2) Pula (Croatia, Adriatic; 11 m depth) and in the Tyrrhenian Sea (Tavolara Island, north-eastern coast of Sardinia, and Island of Elba, Italy; 16 and 4.5 m, respectively; Herler and Patzner 2002); and (3) again in Ibiza, but at 55–56 m depth, outside a cave, on muddy substrata (Ahnelt and Dorda 2004). Recently, Ballesteros (2007) published a picture of *D. splechnai* from Cabrera Island (Spain). According Ballesteros (2007), this species has been observed in a cave at Na Foradada Islet (Cabrera Island) the same year that Ahnelt and Patzner (1995) published the first description of *D. splechnai*. The first record of this fish from the eastern Mediterranean was published by Francour et al. (2007). More than 10 individuals have been observed in Bodrum along the southern Aegean Sea coast of Turkey in August 2005 (Bodrum Peninsula: Gulf of Gökova), at depth range of 8 to 45 m.

Didogobius schlieveni Miller, 1992 was described based on a single specimen collected in the southwest of the Cres Island (Croatia; Miller 1992). Other occurrences of a single specimen were observed in the north Adriatic (Pallaoro and Jardas 1996, Kovačić, 2005). The first record for the western Mediterranean was published by Ballesta et al. (1998) in the marine reserve of Banyuls-

sur-Mer (France). Patzner (2007) reported a new record (still a single individual) at Leghorn (Tuscany; Italy).

New findings in the Mediterranean Sea: In September 2005, ten specimens of *D. splechnai* have been observed in the Cap Roux Marine Reserve (Var, France: lat 43°27'N, long 6°55'E) at depth of 11 to 19 m. The above-mentioned locality yielded a number of individuals of this species, observed regularly inside and around the protected area, within caves or cavities of coralligenous concretions. *D. splechnai* has been also recorded along the French Mediterranean coast from (West to East) La Ciotat (September 2005; lat 43°09'41"N, long 5°37'21"E; depth 42 m; a single specimen), Port-Cros (July 2006; lat 43°01'11"N, long 6°24'34"E; depth 16 m; 3 specimens), Antibes (August 2007; lat 43°33'N, long 7°09'E; depth 20–30 m; a single specimen; Sébastien Blache, personal communication; Fig. 1), and Villefranche-sur-Mer (October 2006; lat 43°41'30"N, long 7°19'14"E; depth 26 m).

The meristics of a specimen collected in the Cap Roux marine reserve are in agreement with those published by Ahnelt and Patzner (1995) except for the pectoral fin (P): 24 mm total length; 19 mm standard length; D1 VI; D2 I/10; A I/9; P 13 (15–16 for Ahnelt and Patzner 1995); C 15; V I/5–I/5; L1 30 (4 rows of cycloid scales and 26 ctenoid). The head showed a complete anterior oculo-scapular and preopercular canals with pores σ , λ , κ , ω , α , ρ , and γ , δ , ϵ ; with no posterior oculo-scapular canal. Five transverse rows have been clearly observed (1, 2, 3, 4 or 5, 5s/5i or 6s/6i (see Ahnelt and Patzner 1995 for the homologies of these infraorbital rows); the row 7 was

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Fig. 1. Underwater photograph of *Didogobius splechnai* in a cave (depth of 20–30 m), near Antibes, France (lat 43°33'N, long 7°09'E); photograph: Sébastien Blache

reduced to a single papilla. The presently reported specimen is conserved in the collection of the Nice University (ICPF 06-037).

All the specimens of *D. splechnai* were found in the innermost parts of caves or close to the entrance of small cavities and were only detectable using artificial light. The fish usually rested on the sandy bottom (13 of the 15 specimens observed) and more rarely on rock (2 specimens), close to an entrance of a nearby hole. In all cases, the bottom of the hole/cave was sand without mud, except in Villefranche-sur-Mer where a single specimen has been observed within a small cavity with a muddy bottom. In most cases, a single individual has been observed in the cavity. However, in the Cap Roux Marine Reserve, up to 3 fish of different sizes (small and large) were observed in the same cavity.

During sampling of *Diplodus annularis* (Sparidae) at night in a *Posidonia oceanica* meadow, in front of the marine station of Endoume (Marseille, France: lat 43°16'48"N, long 5°20'57"E; July 1996; 300 km eastward from the sighting reported by Ballesta et al. 1998), a single individual of *D. schlieveni* was observed among *P. oceanica* shoots, at depth of 10 m. The specimen was relatively inactive, and it was easy to clearly see the conspicuous colour pattern (5 white blotches; dark colour pattern; white margin for the unpaired fins), allowing identification of the species. Previously, another specimen of *D. schlieveni* was recorded in Banyuls-sur-Mer area by Nicolas Bailly (personal communication 29/03/2006). A single specimen was observed among pebble close to the Grosse Island (lat 42°28'58"N, long 3°08'15"E) at depth of 15 m, during a night dive in August 1993, i.e., 4 years before Ballesta's record in June 1997 (Ballesta et al. 1998). Nicolas Bailly who conserved an accurate drawing of his observation was not able to identify this species until the publication of Ballesta et al. (1998) displaying a colour underwater picture.

The new observations reported in this paper confirm the ecological characteristics previously described for *D. splechnai* (cf. Patzner 1999, Herler and Patzner 2002). Along the eastern part of the French Mediterranean coast, *D. splechnai* is more frequent in caves without mud than the ones with a muddy bottom. Habitat preferences of *D. splechnai* are well in accordance with those recorded in all the Balearic islands (Ahnelt and Patzner 1995, Ballesteros 2007) and on the southern Aegean Sea (Francour et al. 2007). This species is considered as cryptobenthic and shy species, closely associated with holes and cavities of the coralligenous formations (Patzner 1999). Some specimens have been collected outside caves: on mud in deep waters (Ahnelt and Dorda 2004), pit covered with gravel (Stefanni 1999) and among rhizomes of *Posidonia oceanica* (cf. Herler and Patzner 2002).

The aforementioned records expand the known distribution of *D. splechnai*, which was not previously recorded in France (Dufour et al. 2007). The previous records showed a strongly scattered distribution in the Mediterranean. These new records along the French Mediterranean, with a probable continuous distribution from La Ciotat to Villefranche-sur-Mer, confirm the hypothesis of Herler and Patzner (2002) who suggested that the actual distribution of cryptobenthic gobiids could be interpolated between the known localisations.

The infrequent capture of small-sized fishes like gobiids in the past was not always an indication of the true numerical rarity. Nowadays, the rather common use of techniques such as SCUBA diving has demonstrated the abundance and diversity of small gobiid fishes in the Mediterranean Sea (e.g., Ahnelt and Patzner 1995, Ahnelt and Kovačić 1997, Ahnelt et al. 1998, Herler et al. 1999). Among many attempts to recognize different forms of rarity (Gaston 1994), Rabinowitz et al. (1986) has classified species using geographic distributions (wide vs. narrow), habitat selection (broad vs. restricted), and local density (high vs. low). Rare species usually refers to a species occurring: (1) at many sites but at low densities (broad habitat selection and low local density); or (2) at only a few sites in low or high numbers (restricted habitats and low or high local density). Distinguishing the causes and consequences of rarity is often difficult. Species become rare by several means, and rarity is associated with a variety of evolutionary and ecological factors, including habitat specificity, local population size and geographic range (Gaston 1994). The rarity definition proposed by Rabinowitz et al. (1986) and discussed by Gaston (1994) is relevant to these two cryptobenthic species (*D. splechnai* and *D. schlieveni*): occurrence at only few sites where suitable habitats are available and with low or high densities.

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