

Settlement of the lessepsian blue-barred parrotfish *Scarus ghobban* (Teleostei: Scaridae) in the eastern Mediterranean

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A specimen of the Indo-Pacific parrotfish *Scarus ghobban* has been reported from the Mediterranean Sea. The fish, the second one from the Mediterranean, was speared off the shore of Beirut (Lebanon) in November 2004. Morphometric measurements and meristic traits are provided and the presence of the species in the Mediterranean since 1999 is discussed.

The parrotfish (Scaridae) are a family of marine tropical fish distributed in the Indian, Pacific and Atlantic Oceans (Froese & Pauly, 2004). They are characterized by fused teeth and bright colours which make them known as parrotfish (Randall, 1986; Nelson, 1994). Their beak-like jaws grow continuously, thus compelling those herbivores to graze constantly on dead corals and other hard substrate in order to file them (Froese & Pauly, 2004). A large part of the stomach contents found in 15 specimens studied by Sano et al. (1984) was composed of calcareous powder which results from grazing on coral substrates. This allows them to have an important impact on tropical reefs' bioerosion (Bruggemann et al., 1996).

The blue-barred parrotfish, *Scarus ghobban* Forsskål, 1775, is a wide-ranging Scaridae found from the eastern Pacific to the Red Sea and south to Algoa Bay in South Africa (Randall, 1986). According to the same author, this species has a preference for shallow reefs, sandy areas of lagoons and bays. It can reach up to 70 cm LT in length. *Scarus ghobban* is generally valued as a fish for human consumption (Lee & Sadovy, 1998).

The Suez Canal (opened in 1869) connected the Red Sea to the Mediterranean and allowed the introduction and settlement of hundreds of Indo-Pacific organisms to the Mediterranean (Fishelson, 2000; Galil et al., 2002; Golani et al., 2002; Zenetos et al., 2003). This introduction, which is known as lessepsian migration (Por, 1978, 1990), represents a continuous and unique phenomenon that enables the direct observation of introductions and colonization in a marine environment. From the estimated number of around 1000 alien species in the Mediterranean, 62 species of lessepsian fish have been reported so far (Golani et al., 2002, 2004), of which some are exhibiting recent extension in their geographical range (Bilecenoglu et al., 2002; Azzurro & Andaloro, 2004; Azzurro et al., 2004). Some species have become important in the composition of the eastern Mediterranean ichthyofauna communities and also acquired an economic importance in that region's fisheries (Bilecenoglu & Kaya, 2002; Bariche et al., 2004).

In October 2001, the first Mediterranean specimen of the blue-barred parrotfish was caught off the coast of Shiqmona in Israel (Goren & Aronov, 2002). On 9 November 2004, a second specimen of the same species was collected from Beirut in Lebanon (Figure 1). This specimen (Figure 2A) was speared during the day at a depth of 31 m over a rocky bottom scattered with mud. The specimen has been deposited at the ichthyological collection of the American University of Beirut (AUBM OS3500).

Description of the Lebanese specimen

The specimen is an immature fish (initial phase) measuring in total length 218 mm and 178.7 g in weight. Description of the fish followed closely those given by Randall (1986), except for the dental plates colours which were white and not pale salmon pink in colour. Meristic formula of the specimen is the following: D, IX+10; A, III+9; P, 15; V, I+5; LL, 20+7; GR, 48 and morphometric measurements are given in Table 1.

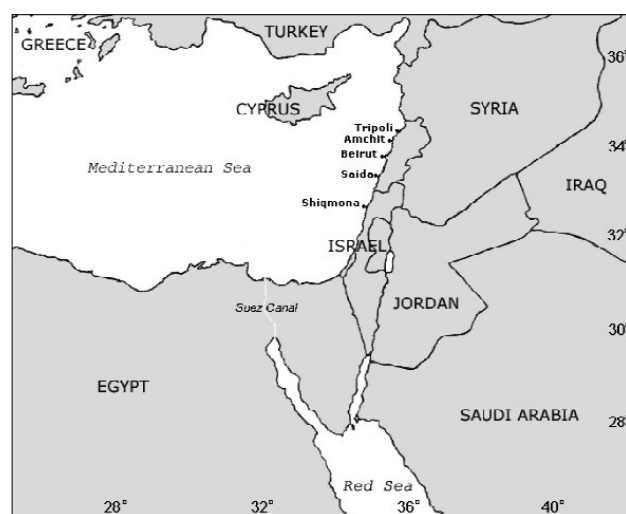


Figure 1. Map of the eastern Mediterranean and the northern Red Sea, showing the locations where *Scarus ghobban* were observed or collected.

Table 1. Morphometric characters of the Mediterranean specimen *Scarus ghobban* caught off the coast of Beirut (Lebanon). Measurements were made according to Froese & Pauly (2004).

Measurements	Absolute value (mm)	%
Total length (LT)	218	–
Standard length	180	82.6 LT
Fork length	217	99.5 LT
Pre-anal length	112	51.4 LT
Pre-dorsal length	57	26.1 LT
Pre-pelvic length	54	24.8 LT
Pre-pectoral length	50	22.9 LT
Body depth	65	29.8 LT
Caudal peduncle depth	26	11.9 LT
Head length (LH)	57	26.1 LT
Eye diameter	9	15.8 LH
Snout length	22	38.6 LH

The Lebanese specimen is the first blue-barred parrotfish caught in Lebanon but not the first sighting from that country. A coloured photograph of a speared adult fish (terminal phase) was provided by a fisherman from Amchit area in October 1999 (Figures 1 & 2B). Although easily recognizable as *Scarus ghobban*, the photograph constituted a weak proof of its presence in Lebanon in 1999. One specimen was also spotted in April 2000 by the first author at the fish market in Saida (Figure 1). This observation was also neglected since tropical fishes are sometimes imported to the Lebanese market. On July 2005, two new specimens were speared from two localities South of Saida and North of Amchit (Figure 2C, D). Since that time, many 'coloured parrotfish' are being observed underwater or reported by different divers along the Lebanese coast (Figure 1). The Lebanese specimen captured and preserved (Figure 2A); together with the specimen caught in Israel (Goren & Aronov, 2002) and the multiple sightings from Lebanon suggest the establishment of a small self-maintaining population of *S. ghobban* in the eastern Mediterranean region since at least 1999.

The success of lessepsian migrants can be explained by the competitive superiority and pre-adaptation of the tropical Indo-Pacific fish over the Mediterranean species and also by the existence of unsaturated niches in the Levant basin (Golani, 1999). Prior to lessepsian migration, *Sarpa salpa* (Linnaeus 1758) (Sparidae) and *Sparisoma cretense* (Linnaeus 1758) (Scaridae) were the only native herbivorous fish species in the Mediterranean (Bauchot & Hureau, 1986; Quignard & Pras, 1986). *Sparisoma cretense* feed on seaweeds and small benthic invertebrates while *Salpa salpa* is almost exclusively herbivore. *Salpa salpa* used to be very abundant along the coast of Lebanon and Syria (Gruvel, 1931). The establishment of lessepsian herbivorous fish, *Siganus rivulatus* Forsskål, 1775 and *Siganus luridus* (Rüppell, 1829) affected the population structure of native Mediterranean herbivores. In Lebanon, *S. rivulatus* has been the most abundant species (72%), followed by *Sparisoma cretense* (20%), *Siganus luridus* (8%), and *Salpa salpa* (<1%). This indicates that the *S. salpa* population declined dramatically in the last 70 years (Bariche et al., 2004). The native *Sparisoma cretense* is known to feed primarily on seaweeds with small invertebrates which have been recovered from their stomachs (Quignard & Pras, 1986). *Sparisoma cretense* was the second most abundant herbivorous fish in Lebanon (Bariche et al., 2004). The presence of the new introduced Scaridae *Scarus ghobban*, known to feed also on seaweeds, sea grasses and detritus (Sano et al., 1984; Ochavillo et al., 1992; Grove & Lavenberg, 1997) might have a direct effect on the population of the native confamilial *Sparisoma cretense* in the eastern Mediterranean.

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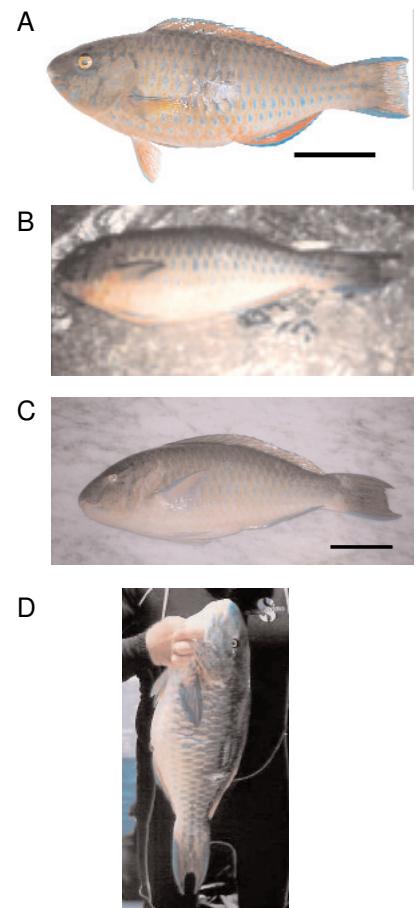


Figure 2. Specimens of *Scarus ghobban* caught in Lebanon. (A) Beirut, 9 November 2004; (B) Amchit, October 1999; (C) Batroun, North of Amchit, July 2005; (D) Sarafand, South of Saida, July 2005. Scale bar: 5 cm

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