Gilthead Sea Bream

(*Sparus aurata*)

Summary

Size (total length)	70 cm 35 cm
Lifespan	11 years (Campillo, 1993)
Size of maturity (L_{50}) (Mediterranean)	17.6 – 32.6 cm
Fecundity	<1 million (Sola et al., 2007)
Reproductive frequency	Annual
Capture methods	Gill nets, hooks & lines, trawls
Minimum Landing Size	-
Fishing Season	November – March Year round as bycatch

Description

Gilthead sea bream (*Sparus aurata)* is a warm water species distributed along the east Atlantic coasts from Cape Verde and the Canary Islands to the south coast of the British Isles (Lythgoe and Lythgoe, 1971; Fischer et al., 1981). It is common throughout the Mediterranean Sea (Mehanna, 2007) but has only expanded its range to the southern coasts of England and Ireland within recent years (Fahy et al., 2005). Since 2001 large numbers of juvenile gilthead sea bream have been recorded in south west England and encountered on the south coast of Ireland since 2003 (Fahy et al., 2005). Previous to 2001 juvenile gilthead sea bream less than 10 cm in length were only occasionally recorded.

Gilthead sea bream inhabit shallow coastal waters in small groups or as individuals and utilise a range of habitats from seagrass beds to rocky and sandy bottoms to depths of 150 m (Fischer et al., 1981; Wheeler, 1987; Lythgoe and Lythgoe, 1971). The species can tolerate brackish water and adults may migrate into lagoons and estuaries (Chaoui et al., 2006; Lythgoe and Lythgoe, 1971). They feed mainly on crustaceans and molluscs, particularly beds of mussels and oysters (Lythgoe and Lythgoe, 1971; Wheeler, 1978).

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Reproductive Life history

The gilthead bream is a protandrous hermaphrodite meaning it matures as a male but may change sex to a female later in life. In the Mediterranean gilthead bream spawn between November and February (Mehanna, 2007; Hadj-Taieb et al., 2013; Fateh et al., 2018) with gonad maturation beginning from October (Chaoui et al., 2006; Hadj-Taieb et al., 2013). It is suspected that within recent years gilthead bream have begun to spawn in its northern range as the occurrence of 0-year group specimens have been increasingly encountered in coastal surveys in the Irish and Celtic Sea (Fahy et al., 2005). In 2006 postlarval and juvenile gilthead bream (<20 mm in length) were consistently collected for four months from April-July in the brackish waters of Wexford Harbour, Ireland (Craig et al., 2008). The size of the juveniles indicates successful winter spawning in or close to the southern coast of Ireland (Fahy et al., 2005). Spawning activity in the English Channel has not yet been confirmed but juvenile gilthead bream have been captured in small fish surveys undertaken by Southern IFCA and large schools of giltheads are encountered between November and March in the inshore waters of Dorset and Hampshire which would coincide with the spawning period throughout the rest of the species range.

Spawning takes place in the open sea and is triggered by lower water temperatures (Fateh et al., 2018). In mass spawning aggregations females release 20,000 – 80,000 eggs per day for up to 3 months (Sola et al.,2007). The planktonic larval stage is prolonged at around 50 days and over this time period the larvae drift to shallow, inshore nursery habitats (Sola et al., 2007). The gilthead bream spends its early life in the brackish waters of lagoons, estuaries and bays and is vulnerable to low temperatures (Craig et al., 2008; Ibarz et al., 2003). Outbreaks of disease occur in populations of farmed gilthead bream when water temperatures decline and it is suggested the metabolic activity of giltheads reduces at temperatures below 12°C (Ibraz et al., 2003). Adult and juvenile gilthead bream remain in inshore waters throughout the summer before adults return to deeper water in the winter to breed (Lythgoe and Lythgoe, 1971). Gilthead bream grow to a maximum size of 70 cm but are more commonly 35 cm in length (Fischer et al., 1981; Lythgoe and Lythgoe, 1971; Wheeler, 1978).

Size of maturity (SOM)

Size of maturity (SOM) is often used to help establish an appropriate Minimum Conservation Reference Size (MCRS) to ensure individuals can reproduce at least once before capture. For finfish, SOM is commonly accepted as the total length (L) at which 50% of a population are mature and is referred to as the L_{50}. Maturity in finfish is determined by the classification of gonad development based on macroscopic (external appearance of the gonad) or microscopic (histology) methods. Histological techniques (analysis of microscopic morphological features) provide the most accurate results but it is a time consuming and expensive process. Maturity classification based on the external appearance of the gonad is quick, simple and cheap however, it is not as accurate as histology and results may be subjective (Brown-Peterson et al., 2011).

The SOM for gilthead bream in UK waters is not known and as such Southern IFCA are currently collecting data to better understand sexual maturity of gilthead bream that may spawn in the English Channel. In the Mediterranean gilthead bream reach SOM between 17.6 cm and 32.6 cm (table 1). Males mature at a smaller size between 17.6 cm and 20.5 cm whereas females mature between 19.6 cm and 22.8 cm. In studies that combined male and female values sexual maturity ranged between 25.7 cm and 32.6 cm. The smallest mature male and female gilthead bream encountered in Port Said, Egypt was 17 cm (Mehanna, 2007). Age at maturity also differs across the species range in the Mediterranean. In Bardawil lagoon, Egypt, males and females were found to be mature at around 5.5 and 10 months respectively (Ahmed, 2011). Whereas individuals in Port Said, Egypt, and Mellah lagoon, Algeria, mature at an average age of 18 – 20 months (Mehanna, 2007; Chaoui et al., 2006).

Males were observed to change sex between 15 and 27 cm in Port Said (Egypt) and the Gulf of Gabes (Tunisia) (table 1). All fish over 32 cm in Port Said were female (Mehanna, 2007). Sex inversion occurred at a greater size in Mellah lagoon (Algeria) at 44 cm and only 40% of bream changed sex at two years and over (Chaoui et al., 2006).

Table 1. Size at maturity estimates (L_{50}) and size at sexual inversion for gilthead sea bream (*Sparus aurata*) across its Mediterranean range. All measurements given in cm. Please refer to the Appendix for more information.

Location	Male	Female	Sexual Inversion	Reference
Gulf of Skikda, Algeria	18.3	19.6	-	Fateh et al., 2018
Gulf of Gabes, Tunisia	17.6		18.7	Hadj-Taieb, 2013
Bardawil lagoon, Egypt	20.5	22.8	-	Ahmed, 2011
Port Said, Egypt	25.7		15-27	Mehanna, 2007
Mellah lagoon, Algeria	32.6		44	Chaoui et al., 2006

Southern IFCA Fishery

Fishing activity

Gilthead bream is a highly valued eating fish however most gilthead bream sold in the UK is imported from fish farms in the Mediterranean. Historically, it has not been a commercial species in the UK but within recent years a fishery has started to emerge in Dorset and Hampshire. In the winter months between November and March gilthead bream are targeted using gill nets and are also regularly caught as bycatch in nets and trawls. They may also be caught by commercial hook and line fisheries throughout the year.

Recreational

Gilthead bream is a very popular species amongst recreational anglers and spearfishers. Anglers target the species from the shore and from vessels with charter boats in the Southern IFC district offering targeted trips between September to November. Gilthead bream are infrequently encountered by spearfishers between June and October off the South Coast of England (Spearfishing UK, 2011).

Landings & Value of Fishery

Southern IFCA do not hold effort or catch data for gilthead bream but landings data from the MMO can help indicate the scale of the fishery within the Southern IFC district over time. Landings of gilthead bream from 2018 onwards have been recorded under the general category of ‘sea breams’ therefore data on individual species landings are only available from 2005 to 2017. It is also possible that some gilthead bream landings would have been recorded under general ‘sea breams’ during this outlined period.

Between 2005 - 2017 total landings of gilthead bream into ports within the Southern IFC district ranged from 0 to a high of 2 tonnes in 2009 (fig 1*). Landings were below 0.5 tonnes in most years with the exception of 2009, 2013 and 2016 when landings were 2, 1 and 0.7 tonnes respectively.

Based on the value of landings in figure 1 the price per tonne of gilthead bream in 2017 was around £5,390. Between 2013 and 2017 the average value per tonne of gilthead bream was £4,550.

The amount of gilthead bream retained by recreational anglers and spearfishers in the District is not known.

*these figures represent vessels that land into ports in the Southern IFC district, some of which would have fished outside the district and be >12 metres in length.

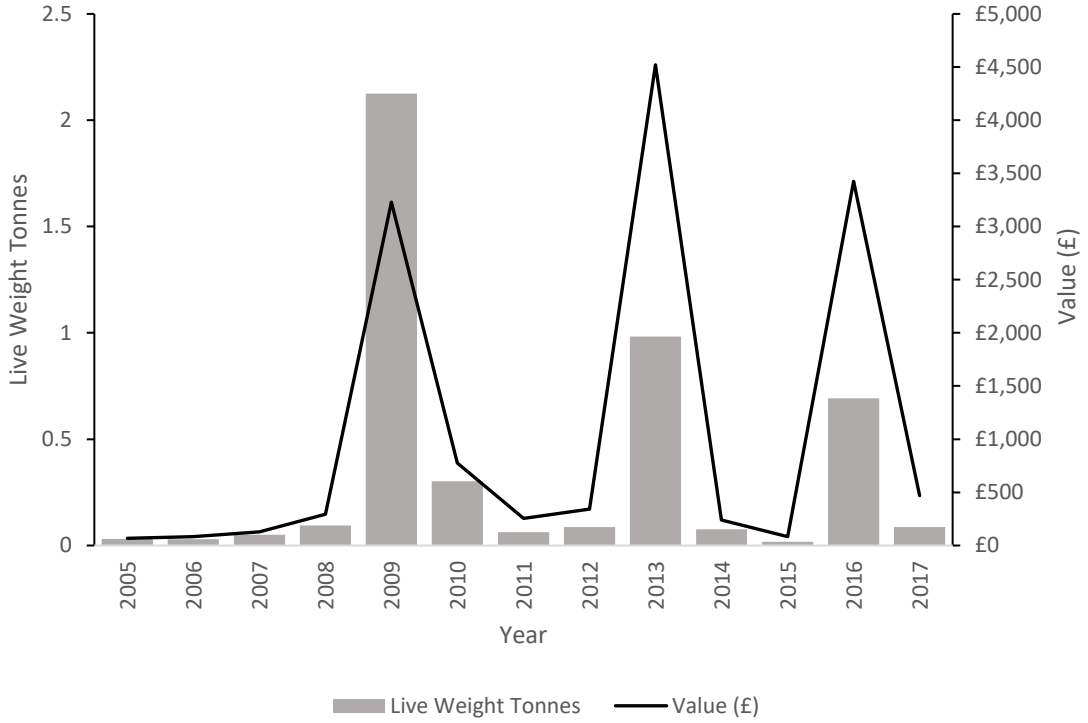

Figure 1. Landings of gilthead sea bream (*Sparus aurata*) into ports within the Southern IFC district from 2005 to 2017. Data sourced from the Marine Management Organisation (MMO)

Very little is known about gilthead bream stock in the English Channel and whether the stock is separate to the Bay of Biscay.

Associated management

There is no Minimum Conservation Reference Size (MCRS) in place for gilthead bream in the Southern IFC district nor is there a minimum size under EU technical regulations.

Due to the limited size of the fishery, there are no management measures in place for this species.

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Appendix

Table A. Size at maturity estimates (L_{50}), size at sexual inversion and age at 50% maturity for gilthead sea bream (*Sparus aurata*) in the Mediterranean. Measurements given in cm for total length.

Study location	Total No. surveyed	No. of individuals (n)		Length Data		Size at Maturity Data									Reference
				Size range		Total No. of individuals	No. of individuals (n)		Size of smallest mature individual		Size at 50% maturity (L_{50})		Size at sexual inversion	Age at 50% maturity (years)		
		M	F	M	F		M	F	M	F	M	F		M	F	
Gulf of Skikda, Algeria	576	391	185	17.5-28.7	18-29.3	-	-	-	-	-	18.3	19.6	-	-	-	Fateh et al., 2018
Gulf of Gabes, Tunisia	1065	520	442	10-30	12-35	-	-	-	-	-	17.6	-	18.7	-	-	Hadj-Taieb, 2013
Bardawil lagoon, Egypt	3262	-	-	11-32.9		-	-	-	-	-	20.5	22.8		0.47	0.83	Ahmed, 2011
Port Said, Egypt	1714	-	-	10-35.5		-	-	-	-	-	25.7		15-27	1.67		Mehanna, 2007
Mellah lagoon, Algeria	632	-	-	15.7-61		99	-	-	-	-	32.6		44	18 months		Chaoui et al., 2006