

Conger eel

(*Conger conger*)

Summary

Size (total length)	Female 200 cm Male 100 cm (Cau and Manconi, 1983)
Lifespan	20 years (Matić-Skoko et al., 2012)
Size of maturity (L₅₀)	No L ₅₀ available First Maturity 78-200 cm
Fecundity	>1 million eggs (Dipper, 2001)
Reproductive frequency	Female - Single spawning event Male – Annual (Casadevall et al., 2017)
Capture methods	Bycatch in trawls, nets, pots
Minimum Conservation Reference Size	58 cm
Fishing Season	Year-round



Description

The European conger eel (*Conger conger*) is the largest species of eel in Europe and is widely distributed from Norway and Iceland to Senegal, including the Mediterranean, Azores and Canary Islands (Tighe, 2015). It is considered to be moderately abundant throughout its range.

The conger eel inhabits sandy and rocky coasts, colonising crevices in rocks, shipwrecks, and harbour walls from the shoreline to depths of 1,200 m (Tighe, 2015; Wheeler, 1978). It is an opportunistic predator that feeds mainly at night by foraging in the water column and near rocky areas for bony fish, crustaceans and cephalopods such as octopus (Wheeler, 1978; Vallisneri et al., 2007).

Reproductive Life history

Knowledge of the conger eel's reproductive biology is poor with many unanswered questions concerning when, where and how the species reproduces, as spawning activity has never been observed in the wild. However, it is widely agreed that conger eels migrate to deep offshore waters to spawn in depths ranging from 600 m to 4000 m (Cau and Manconi, 1983; Wheeler, 1978; Lythgoe and Lythgoe, 1971; Casadevall et al., 2017). Several spawning grounds have been identified to serve conger eels in the North Eastern Atlantic including in the Sardinian Channel (Cau and Manconi, 1983) between Gibraltar and the Azores (Lythgoe and Lythgoe, 1971) and in or near the

Azores archipelago (Correia et al., 2003). The spawning season is believed to take place in the summer months but may vary depending on location. In the Mediterranean Sea, Strehlow et al, (1998) suggested spawning took place between July and September.

Female conger eels exhibit a semelparous reproductive strategy meaning they only reproduce once. As the ovaries develop, they increase to an enormous size that entirely fills up the abdominal cavity of the female, pressing the other abdominal organs into a small space. Based on females examined in captivity the weight of the ovaries can exceed one third of the total body weight (Cunningham, 1891). The body tissues, bones and teeth of the female degenerate as the ovaries increase in size, which eventually reduces the female's ability to hunt and maintain buoyancy (Cunningham, 1891; Casadevall et al., 2017). After releasing several million eggs the female dies due to her degenerative state (Dipper, 2001; Casadevall et al., 2013). In contrast, it is thought that males do not experience deterioration after spawning therefore they could potentially have the ability to reproduce annually in multiple spawning seasons (Casadevall et al., 2017).

Little is known about larval development and migratory routes but Correia et al, (2002) suggests the leptocephalus (flat and transparent oceanic larval stage of eels) ranges in size from 10-16 cm and develops for about 6-9 months before metamorphosis. During this time the larva is transported to shallow inshore waters where development into a juvenile conger eel is completed (Wheeler, 1978). Conger eels grow relatively slowly at around 10 cm a year (Sbaihi et al., 2001). Males rarely grow over 100 cm whereas females can reach over 200 cm (Cau and Manconi, 1983). Maximum length can be up to 274 cm (9ft) weighing around 65kg (143lb) (Wheeler, 1978). The maximum lifespan of a conger eel is suggested to be 20 years (Matić-Skoko et al., 2012).

Studies have highlighted a sex segregation in the conger eel population where males and females occupy different depths. Immature females are almost exclusively caught in coastal inshore waters whilst males are mostly absent from this area, instead being caught in deeper offshore waters. The absence of ripe or spent females in coastal inshore waters suggests that females become sexually mature during their migration towards their offshore spawning grounds (Correia et al., 2009; Cau and Manconi, 1983; Sbaihi et al., 2001; Sullivan et al., 2003; Casadevall et al., 2017; Matić-Skoko et al., 2012).

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).

There is extremely limited data on the size of maturity for the European conger eel as it is very difficult to sample mature females. One study undertaken in Algeria analysed 770 conger eels (n=450 female) and concluded size at first sexual maturity is 78 cm in males and 88 cm in females (Mazouz and Abi-Ayad, 2015). It is widely referenced that conger eels reach sexual maturity between 5 and 15 years of age but no studies could be found to confirm this.

The Minimum Conservation Reference Size (MCRS) for conger eel caught within the Southern IFCA district is 58 cm. Based on the limited data available the current minimum size is below the estimated size of first sexual maturity. However, as only immature females are found in inshore waters and females die soon after spawning offshore, SOM is not the most appropriate factor to base an MCRS upon for this semelparous species.

Southern IFCA Fishery

Fishing activity

Conger eel isn't a targeted species within the Southern IFCA district as there is little market demand for it as an eating fish. It is occasionally taken as bycatch in trawl, pot and net fisheries and either landed or used as bait for pot fisheries. Over the last few years, it is believed that the population of conger eels within the District has increased because there has been increased interactions between conger eels and pot fisheries with conger eels often removing bait from entire strings of pots (local fisherman, personal communication, January 28, 2021).

Recreational

The conger eel is a popular recreational angling fish due to its size. The species can be fished from shore close to rough ground but the biggest specimens are caught in deeper water. The English Channel is recognised as a popular area for conger eel angling as large specimens are found amongst the many wrecks. Charter boats in the area provide opportunities to target conger eels as part of deep sea and wreck fishing trips. The species can be caught year-round and recreational anglers' fish on a catch and release policy.

Landings & Value of Fishery

In 2019, 12 tonnes of conger eel was landed into ports within the Southern IFC District valued around £10,600 (fig 1*). Between 2005 and 2009 landings increased from around 3 tonnes to a maximum of 18 tonnes per year. Following 2009 landings gradually declined to a low of 6 tonnes in 2013 before gradually increasing once again to similar pre-2009 levels between 7-15 tonnes per year. The value of conger eels has remained relatively stable over the years sitting between an estimated £700-£900 per tonne. The value increased slightly during years of low landings (2012-2015) to just over £1000 per tonne and this value continued into 2015 and 2016 before returning to around £850 per tonne in 2018-2019.

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



Figure 1. Landings of European conger eel (*Conger conger*) into ports within the Southern IFCA district from 2005 to 2019. Data sourced from the Marine Management Organisation (MMO)

The conger eel is not subject to stock assessments by ICES and there is little data available on the population. Catches have increased over recent years but the species is not considered to be threatened and is listed as Least Concern by the International Union for Conservation and Nature (IUCN) (Tighe, 2015).

Associated management

Landings of conger eel in the Southern IFCA district are solely managed through a Minimum Conservation Reference Size (MCRS) which prevents the landing of individuals below 58 cm in length. There is no national or European MCRS but 58 cm is enforced by several other authorities including two other IFCAs (table 1). As previously outlined due to the life cycle of the conger eel an MCRS will not prevent the landing of sexually immature individuals as females mature during their migration to their spawning grounds and die shortly after spawning. However, an MCRS can be utilised for other purposes.

There are no other management measures in place for the conger eel.

Table 1. Minimum Conservation Reference Size (MCRS)/ Minimum Landing Size (MLS) for the conger eel (*Conger conger*) in Inshore Fisheries and Conservation Authority districts (IFCA) and other regions.

IFCA	Minimum Conservation Reference Size (MCRS)
Northumberland	-
North Eastern	-
Eastern	-
Kent & Essex	-
Sussex	-
Southern	58
Devon & Severn	-
Cornwall	58
Isles of Scilly	-
North Western	58
Other	
EU	-
States of Jersey Government	58
North Wales	58

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