

Stock Annex: Greater forkbeard (*Phycis blennoides*) in subareas 1–10, 12 and 14 (the Northeast Atlantic and adjacent waters)

Stock specific documentation of standard assessment procedures used by ICES.

Stock: Greater forkbeard

Working Group: Working Group on Biology and Assessment of Deep-sea Fisheries Resources (WGDEEP)

Created:

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A. General

A.1. Stock definition

The Greater forkbeard is a gadoid fish which is widely distributed in the North-eastern Atlantic from Norway and Iceland to Cape Blanc in West Africa and the Mediterranean (Svetovidov, 1986; Cohen *et al.*, 1990). It is distributed along the continental shelf and slope in depths ranging between 60 and 800 meters but recent observations on board of commercial longliners and research surveys extend the depth range to below 1000 m (Stefanescu *et al.*, 1992).

Unfortunately very little is known about stock structure of the species. Currently ICES considered greater forkbeard as a single stock for all the ICES area greater forkbeard in the Northeast Atlantic. Probably the stocks structure is more complex, but further studies needs to be implemented to allow a scientific basis for the stock structure.

A.2. Fishery

Greater forkbeard is as a bycatch species in the traditional demersal trawl and longline mixed fisheries targeting species such as hake, megrim, monkfish, ling, and blue ling in Subareas 6, 7, 8 and 9.

Since 1988, 71% of landings have come from Subareas 6 and 7. Spanish, French and UK trawl and longline are the main fleets involved in this fishery. The Irish mixed deep-water fishery around Porcupine Bank historically landed important quantities of this species but since 2006 the landings of this country have been reduced strongly. Russian fisheries in the Northeast Atlantic land small quantities of greater forkbeard as bycatch of the trawler fleet targeting roundnose grenadier, tusk and ling on Hatton and Rockall Banks.

A further 20% of landings in this period come the French and Spanish trawl and longline fleets in Subareas 8 and 9 (mainly from 8). In Subarea 9 since 2001 small amounts of *Phycis* spp (probably *Phycis phycis*) have been landed in ports of Strait of Gibraltar

by the longliner fleet targeting scabbardfish in Algeciras, Barbate and Conil. Portuguese landings of *P. blennoides* are scarce but however important amounts of other *Phycis* species are reported every year in Subarea 9.

Minor quantities of *Phycis blennoides* are landed by Portugal in Subarea 10 and by Norwegian and in recent years Faroese vessels in Divisions 5.a and 5.b. The Azores deep-water fishery is a multispecies and multigear fishery dominated by the main target species *Pagellus bogaraveo*. Target species can change seasonally according to abundance and market prices, but *P. blennoides*, representing less than 1% of total deep-water landings in the last three years, can be considered as bycatch.

A.3. Ecosystem aspects

For greater forkbeard can be applied the same ecosystem considerations of other deep-water fisheries in the areas defined for the stocks. Fishing is a major disturbance factor of the continental shelf communities of the regions. As the fishery of Greater forkbeard is mainly a bycatch of trawler fishery in all ecoregions the main affections on the ecosystem is the impact on the sediment compound.

B. Data

B.1. Commercial catch

Landings by country and subareas are presented in the historical series. The discards estimates in 2013, 2014 and 2015 accounted 36%, 34% and 48% of the total catches respectively and in 2015 affected specially to individuals smaller than 17 cm of which the 100% were discarded. (Table 11.2a). In 2015 the reported discards come from Subarea 6 (66%), 8 (15%) and 7 (13%). The discards in the rest of subareas remain unknown.

B.2. Biological

The biology of the species is poorly known. In general most of biological data are not reliable or not available (e.g. age composition, maturity, growth, natural mortality). In Tables 3 and 4 a compilation of biological available data are shown. (WGDEEP 2001 (ICES C.M. 2001/ACFM: 23; Lorange 2010)). The spawning areas and seasonality are also not well (or at all) identified. Only historical series of length frequencies from surveys were available.

Biological Reference Points based on the L_{MAX} and AFC from Casas and Piñeiro, 2000 ⁽¹⁾ (8.c and 9.a) and Muus and Nielsen, 1999 ⁽²⁾ (Mediterranean Sea):

GREATER FORKBEARD	L_{MAX}	AFC	L_{INF}	K	M	T_0	AGEMAX	AGEMAT
females	84 (1)	1y (1)	113.3 (1)	0.0886 (1)		0.663 (1)	14 (1)	3–4 y (2)
males	44 (1)	1y (1)	54.9 (1)	0.217 (1)		0.556 (1)	6 (1)	3–4 y (2)

The following BRP have been extracted from the Table 1, Gislason *et al.*, 2008:

	L_{MAX}	L_{INF}	K	AGE MAT	F _{MAX}	F _{0.1}	F ₁₀	F ₂₀	F ₃₀	F ₃₅	F ₄₀
females	84	86.6	0.181215	3.1	0.24	0.14	0.34	0.22	0.15	0.13	0.11
males	44	45.8	0.272311	2	0.48	0.26	0.61	0.38	0.27	0.23	0.2

WKLIFE Gislason spreadsheet was applied using values for L_{MAX} and AFC derived from Casas and Pineiro, 2000 and Muus and Nielsen, 1999. Some of the parameters estimated by the model (L_{inf} , k ,) were different from those derived by those authors. Notwithstanding, if $F_{40\%SPR}$ is adopted as a proxy for F_{MSY} the values obtained do not seem unrealistic.

Table 3. Life-history characteristics of Greater forkbeard (from WGDEEP 2001 (ICES C.M.2001/ACFM: 23; Lorange, 2010).

LHC	SEX	ESTIMATE	AREA (MONTH)	REFERENCE
Maximum observed length (TL, cm)	combined	50	8.c and 9.a	Sanchez <i>et al.</i> , 1995
	female	84	8.c and 9.a	Casas and Piñeiro, 2000
	male	44	8.c and 9.a	Casas and Piñeiro, 2000
	female	14	8.c and 9.a	Casas and Piñeiro, 2000
	male	6	8.c and 9.a	Casas and Piñeiro, 2000
	combined	2	Atlantic	Cohen <i>et al.</i> , 1990
Maximum observed age (year)	female	9	NE Atlantic	Kelly, 1997
	male	7		
	combined	15	NE Atlantic	EC FAIR, 1999, Sub-t. 5.12, Doc.55
	female	33 cm	NE Atlantic	Cohen <i>et al.</i> , 1990(1,2)
Length at 50% maturity (PAFL, cm)	male	18 cm	Mediterranean	Cohen <i>et al.</i> , 1990(1,2)
	female	32 cm	NE Atlantic	Kelly, 1997
	male	31 cm	Mediterranean	
	combined	3–4 yrs	Mediterranean sea	Muus and Nielsen, 1999
Age at 50% maturity Combined (year)	combined	6 cm	8.c and 9.a	Casas and Piñeiro, 2000
		8 cm	8.a-b, 8.d (Oct.–Nov.)	Data from French western IBTS
Length of smallest individuals caught (TL)		8 cm	7.g-k (Oct.–Nov.)	Data from French western IBTS
	combined	<1yr	8.c and 9.a	Casas and Piñeiro, 2000
Age of youngest individuals caught (year)	combined	13.9 cm	8.c, 9.a (Apr.)	Casas and Piñeiro, 2000
		16.9 cm	8.c, 9.a (Sept.)	Casas and Piñeiro, 2000
Length of the first mode of the length distribution		17.4 cm	8.c, 9.a (Oct.)	Casas and Piñeiro, 2000
		16 cm	8.a-b, 8.d (Oct.–Nov.)	Data from French western IBTS

Unclear whether it is mean length at first maturity or length of smallest mature individual.

Table 4. Growth parameters of greater forkbeard. (from WGDEEP 2001 (ICES C.M.2001/ACFM:23; Lorange, 2010)).

SEX	L_{∞}	K	T0	AREA	REFERENCE
Male	41.7	0.208	N/A	Gulf of Lions (Med.)	Nony, 1983 (from Fishbase)
Female	51.2	0.258	N/A	Gulf of Lions (Med.)	Nony, 1983 (from Fishbase)
Combined	57.7	0.168	-0.66	Aegean sea (Med.)	Papaconstantinou et al., 1993
Male	54.9	0.217	-0.663	8.c and 9.a	Casas and Piñeiro, 2000
Female	113.3	0.0886	-0.556	8.c and 9.a	Casas and Piñeiro, 2000

New information of L_{mat} , L_{inf} and K was provided for the Spanish Data Call to the WGDEEP in 2018.

	VALUE	REFERENCE	COMMENTS
L_{mat}	53.89	CV=3.4%	both sex, n=960, years: 2015+2016+2017
L_{inf}	91.46	CV=6.3%	both sex, n=1045, years: 2015+2016+2017
K	0.142	CV=10%	both sex, n=1045, years: 2015+2016+2017

B.3. Surveys (use the ICES surveys acronym)

Data of abundance, and biomass of *P. blennoides* and spatial distribution have been collected in Subareas 3, 4, 5, 5.b, 7, 6 and Division 9.a of eight different surveys: SP-PorcGFS, French EVHOE IBTS, Irish IGFS, SP-NGFS, NS-IBTS, SWC-IBTS, Scottish Deepwater Survey and PT-CTS (UWTV (FU 28–29)).

B.4. Commercial Effort and cpue

Commercial Effort data (kWd) of the Spanish and Swedish fleets (OTB, LLS and GTR) by subarea have been provide in 2105.

B.5. Other relevant data

Landings and effort data in 12.b should be included into the assessment if they become reliable. Landings and discards from all areas and fisheries where greater forkbeard occur should be compiled. Because greater forkbeard is a bycatch in shelf and slope fisheries and is subject to discards data on total catch are essential to assess the stock(s).

Greater forkbeard is caught in a number of surveys that are likely to provide reliable trends in either total abundance, recruitment of both. It is recommended that survey data are used to assess stocks trends.

Stock identity knowledge is lacking for greater forkbeard in the Northeast Atlantic. Survey based population indicators of greater forkbeard should be calculated from all relevant survey and provided to WGDEEP. The recommended indicators are: abundance, log abundance, mean length, quantiles of mean length, biomass, per strata and for the whole survey. Interpretation of trends by survey and strata should be used to define the overall trend of greater forkbeard in areas where it is caught.

C. Assessment: data and method

Model used:

Survey trends-based assessment. In 2014 four surveys were accepted for the advice: IE-GFS, FR-EVHOE, SP IBTS SP porcGFS, SP IBTS SPN-GFS.

In 2016 two additional surveys were also used for the Advice: Scottish Deep-water trawler survey (6.a) and PT-CTS (UWTV (FU 28–29) (9.a South).

In 2018 the six surveys used in 2016 were also used for the advice.

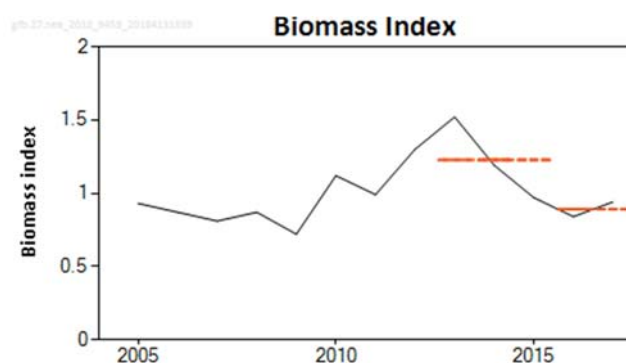


Figure 1. Greater forkbeard in the Northeast Atlantic and adjacent waters. Left: Landings and partial discards. Right: Average standardized biomass indicator from six surveys (IGFS-WIBTS-Q4, EVHOE-WIBTS-Q4F, SpGFS-WIBTS-Q4, SpGFS-WIBTS-Q4, SDS, PT-CTS (UWTV (FU 28–29))). The dotted horizontal lines indicate the average biomass indicator of the respective year range (last two and preceding three years) used to calculate the advice.

D. Short-term projection

E. Medium-term projections

F. Long-term projections

G. Biological reference points

Based on the L_{MAX} and AFC from Casas and Piñeiro, 2000 ⁽¹⁾ (8.c and 9.a) and Muus and Nielsen, 1999 ⁽²⁾ (Mediterranean Sea).

		L_{MAX}	AFC	LINF	K	M	T0	AGEMAX	AGEMAT
Greater forkbeard	females	84 (1)	1y (1)	113.3 (1)	0.0886 (1)		0.663 (1)	14 (1)	3–4 y (2)
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The following BRP have been extracted from the Table 1, Gislason *et al.*, 2008:

	L_{MAX}	LINF	K	AGE MAT	FMAX	F0.1	F10	F20	F30	F35	F40
females	84	86.6	0.181215	3.1	0.24	0.14	0.34	0.22	0.15	0.13	0.11
males	44	45.8	0.272311	2	0.48	0.26	0.61	0.38	0.27	0.23	0.2

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H. Other Issues

Summary of data ranges used in recent assessments:

DATA	2006 ASSESSMENT	2007 ASSESSMENT	2008 ASSESSMENT	2009 ASSESSMENT
Catch data	Years: 1978–(AY-1) Ages: 1–8+	Years: 1978–(AY-1) Ages: 1–8+	Years: 1978–(AY-1) Ages: 1–8+	Years: 1978–(AY-1) Ages: 1–8+
Survey: A_Q1	Years: 1985–AY Ages: 1–7	Years: 1985–AY Ages 1–7	Years: 1985– AY Ages 1–7	Years: 1985– AY Ages 1–7
Survey: B_Q4	Years: 1996–(AY-1) Ages: 1–5	Years: 1996– AY-1) Ages 1–7	Years: 1996– AY-1) Ages 1–7	Years: 1996– AY-1) Ages 1–7
Survey: C	Not used	Not used	Not used	Not used

AY – Assessment year.

(The historic perspective, as well as all the other section on the stock annex, should only update in a benchmark workshop. If there is any reason to deviate from the stocks annex, this should be explain in the Working Group report and only update this deviation in the historic perspective after consultation with ICES Secretariat and WG Chair).

I. References