

Stock Annex: Blackspot seabream (*Pagellus bogaraveo*) in subareas 6–8 (Celtic Seas, the English Channel, and Bay of Biscay)

Stock specific documentation of standard assessment procedures used by ICES.

Stock: Blackspot seabream

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

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A. General

A.1. Stock definition

“Stock limits are generally determined not only by biological considerations but also by agreed boundaries and coordinates. ICES considered three different components for this species: a) ICES subareas 6, 7, and 8; b) ICES subarea 9, and c) ICES subarea 10 (Azores region). This separation does not pre-suppose that there are three different biological stocks of blackspot seabream, but it offers a better way of recording the available information” (ICES, 2007).

In fact, the interrelationships of the blackspot seabream (*Pagellus bogaraveo*) from subareas 6, 7, and 8, and the northern part of Division 9.a, and their migratory movements within these sea areas have been confirmed by tagging results (Gueguen, 1974). Possible links between blackspot seabream from the Azores region (Subarea 10) with the others areas are not yet fully studied. However, recent studies show that there are no genetic differences between populations from different ecosystems within the Azores region (East, Central and West group of Islands, and Princesa Alice bank) but there are genetic differences between Azores (ICES Subarea 10) and mainland Portugal (ICES Division 9.a) (Stockley *et al.*, 2005). These results, combined with the known distribution of the species by depth and tagging information, suggest that Subarea 10 component of this stock can be considered as a separate management unit.

A.2. Fishery

The fishery in Subareas 6, 7 and 8 strongly declined in the mid-1970s, and the stock is seriously depleted. From 1988 to 2008, on average 68% of the landings were caught from Subarea 8 and 32% from subareas 6 and 7. Since 2000, blackspot seabream catches in these areas are almost all bycatches of LLS and OTB fleets. In the past the reporting of catches from small-scale artisanal fleet may have been incomplete. The level of recreational catches is unknown but may be significant.

A.3. Ecosystem aspects

The blackspot seabream is found in the Northeast Atlantic, from south of Norway to Cape Blanc in the Eastern Central Atlantic, in the Mediterranean Sea, and in the Azores, Madeira, and Canary Archipelagos (Olivier, 1928; Desbrosses, 1932; Krug, 1983, Spedicato *et al.*, 2002). Hareide and Garnes (2001) reported also occasional occurrence of this species along the Mid-Atlantic Ridge (north and south of the Azores).

Blackspot seabream is a benthopelagic species that inhabits various types of bottom (rock, sand, and mud) down to a depth of 900 m. The vertical distribution of this species varies according to individual size, and season of the year. Blackspot seabream undertakes a vertical spawning migration, with the adults moving from deeper to shallower waters during the spawning season and forming aggregations.

Environment has changed in the Bay of Biscay, in particular with a warming in the period 1965-2004 (Michel *et al.*, 2009). This warming was considered unlikely to be unfavourable to blackspot seabream, as other stocks of the species are distributed in warmer areas in the Gulf of Cadiz and the Mediterranean Sea.

B. Data

B.1. Commercial catch

Lorance (2011)^o reconstructed a landings time series for the beginning of the 20th century (Figure 1). More recent landings used for assessment are official reported landings. Landings in 2015 dropped significantly to 177 t, mainly due to the decrease of landings reported in Subareas 6 and 7.

Historically, discards are considered negligible. However, in 2014 Spain reported 2.4 t of discards in the trammelnet fleet in the 8.c that constitutes 0.9% of the catches in the year. As the blackspot sea bream is very a highly valued species in Spain, it is likely that these reported discards are carcasses in bad condition recovered from the nets or a misidentification of the species. In 2015, 2.3 t of discards have been reported in the Divisions 7 and 8 mainly by Irish gillnetters and Spanish trawlers.

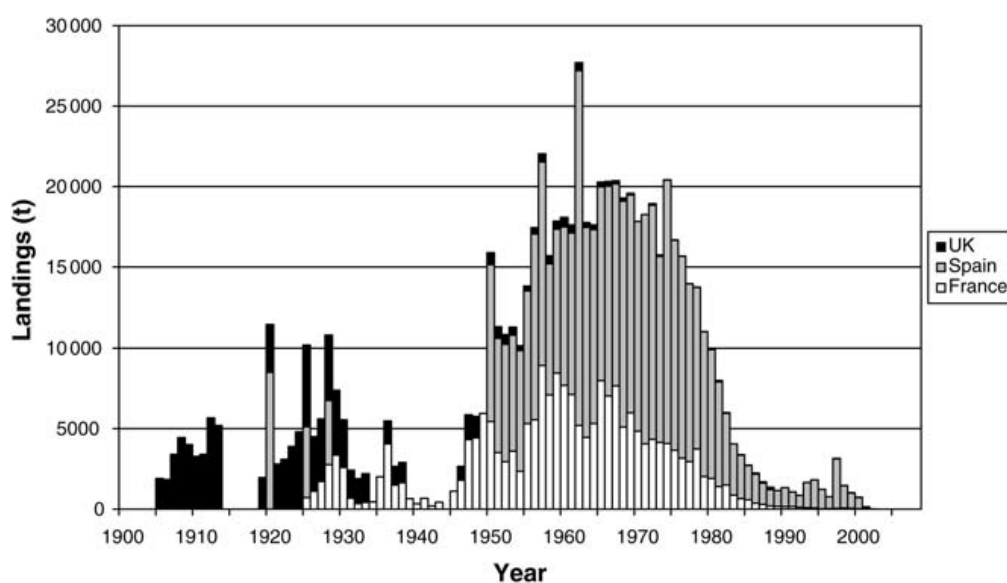


Figure 1. Historical series of Red Seabream landings since 1900 in Subareas 6, 7 and 8 (From Lorance 2011).

B.2. Biological

Pagellus bogaraveo is a protandric hermaphrodite species changing from males to females. Sexing and staging this species is problematic because macroscopic scales are not validated with microscopic observations. Blackspot seabream is considered a slow growing species. Gueguen (1969b) reported a maximum age of 20 years. Natural Mortality of 0.2 estimated by Lorange (2011) was derived from the presumed longevity in the population according the rule $M \frac{1}{4} 4.22/t \text{ max}$, where t is the maximum age in the population derived from data from many populations (Hewitt and Hoenig (2005)). According to this rule the 1% of a cohort survives to 23 years.

Table 1. Von Bertalanffy growth coefficient for *P. bogaraveo* for the Bay of Biscay. From Lorange, 2010.

K	L	To	N	ICES AREA	
0.092	56.8	-2.92		8	Walford method from Guéguen (1969b)
0.162	48.3	-0.72	10186a	8	New fit using data from Guéguen (1969b)
0.137	51.4	-0.97	20b	8	New fit to mean length-at-ages from Guéguen (1969b)
0.209	51.56	-0.53	530	8.c	Sánchez (1983)
0.174	53.9	-0.66		8.c	Ramos and Cendrero (1967)
0.196	48.06	-0.47		8.c	Alcazar et al. (1987)
0.174	54.2	-0.66		8.b,c	Castro Uranga (1990)

^a Size-at-age derived from back calculation (Guéguen, 1969b).

^b Number of age groups.

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

At the current level of abundance, the black spot sea bream is rarely caught in the northern surveys by French IBTS (Divisions 7.f,g,h,j; 8.a,b, and 7.d) and Irish IGFS (Divisions 6.a South and 7.b). In French surveys, similar to the current western IBTS, from early 1980s when the stocks were already low it was still in 40 to 60% of the hauls. This proportion dropped to close to zero by 1985 (Lorange, 2011). This observation indicates that the current survey is appropriate to detect and monitor a recovery of the stock if ever it happens.

In 2014 for first time in last three years the Northern Spanish Shelf bottom-trawl survey (SP-NGFS) reported catches of only 0.02 kg/hour (juveniles from 21 cm to 24 cm) in Divisions 9.a and 8.c. In 2015 this species reached a high abundance value compared to the mean values of the time-series, both in biomass and number, except the values of 1998 and 2005, unusually high. *P. bogaraveo* sizes found in the last survey ranged from 16 cm to 32 cm, presenting a mode in the sizes 21 cm and 23 cm, in accordance with the range of values for the size distribution of the last ten years (Figure 13.2.3). Regarding the geographical distribution, when the species appears, the most abundant catches of blackspot seabream were made consistently in the shallower stations of the central part of the Cantabrian Sea.

B.4. Commercial cpue

No effort or commercial cpue data were available to the working group.

B.5. Other relevant data

C. Assessment: data and method

Model used:

Catch-trend based assessment

Software used: Not applicable

Model Options chosen: Not applicable

Input data types and characteristics:

TYPE	NAME	YEAR RANGE	AGE RANGE	VARIABLE FROM YEAR TO YEAR
				YES/NO
Caton	Catch in tonnes			
Canum	Catch-at-age in numbers			
Weca	Weight-at-age in the commercial catch			
West	Weight-at-age of the spawning stock at spawning time.			
Mprop	Proportion of natural mortality before spawning			
Fprop	Proportion of fishing mortality before spawning			
Matprop	Proportion mature-at-age			
Natmor	Natural mortality			

Tuning data:

TYPE	NAME	YEAR RANGE	AGE RANGE
Tuning fleet 1			
Tuning fleet 2			
Tuning fleet 3			
....			

No HCR has been adopted for this stock.

D. Short-term projection

Not applicable.

Model used:

Software used:

Initial stock size:

Maturity:

F and M before spawning:

Weight-at-age in the stock:

Weight-at-age in the catch:

Exploitation pattern:

Intermediate year assumptions:

Stock–recruitment model used:

Procedures used for splitting projected catches:

E. Medium-term projections

Not applicable.

Model used:

Software used:

Initial stock size:

Natural mortality:

Maturity:

F and M before spawning:

Weight-at-age in the stock:

Weight-at-age in the catch:

Exploitation pattern:

Intermediate year assumptions:

Stock–recruitment model used:

Uncertainty models used:

- 1) Initial stock size:
- 2) Natural mortality:
- 3) Maturity:
- 4) F and M before spawning:
- 5) Weight-at-age in the stock:
- 6) Weight-at-age in the catch:
- 7) Exploitation pattern:
- 8) Intermediate year assumptions:
- 9) Stock–recruitment model used:

F. Long-term projections

Not applicable.

Model used:

Software used:

Maturity:

F and M before spawning:

Weight-at-age in the stock:

Weight-at-age in the catch:

Exploitation pattern:

Procedures used for splitting projected catches:

G. Biological reference points

WKLIFE has not yet suggested methods to estimate biological reference points for stocks which have only landings data or are bycatch species in other fisheries. Therefore, no attempt was made to propose reference points for this stock.

H. Other issues

Its peculiar reproductive biology and aggregative distribution makes blackspot seabream especially vulnerable to fishing.

Because of the sex-changing in blackspot seabream only the old ages contribute significantly to the production of oocytes. Therefore if young fish that are sexually immature then males are exploited the proportion of fish reaching the female stage may become very low. It is therefore essential that catch of small fish are avoided. Target catch of young blackspot seabream may have contributed to the collapse of the stock as the species forms shoals which can be targeted. There has been period with and without minimum landings size. Regulation (EU) 2017/787 of 8 May 2017 set a minimum conservation reference size of 33 cm.

In the 1920s and 1930s, juveniles were widely distributed along the Atlantic coast of Brittany and in the Western Channel along French and UK coasts (Priol, 1932).

H.1. Historical overview of previous assessment methods

Summary of data ranges used in recent assessments:

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

AY – Assessment year.

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