

## Stock Annex: Roundnose grenadier (*Coryphaenoides rupestris*) in divisions 10.b and 12.c, and in subdivisions 12.a.1, 14.b.1, and 5.a.1 (Oceanic Northeast Atlantic and northern Reykjanes Ridge)

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Stock specific documentation of standard assessment procedures used by ICES.

<b>Stock:</b>	Roundnose grenadier
<b>Working Group:</b>	Working Group on Biology and Assessment of Deep-sea Fisheries Resources (WGDEEP)
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### A. General

#### A.1. Stock definition

See annex “Roundnose grenadier in 5.b, 6, 7 and 12.b”.

#### A.2. Fishery

The fishery on the northern Mid-Atlantic Ridge (MAR) started in 1973, when dense concentrations of roundnose grenadier were discovered by USSR exploratory trawlers. Roundnose grenadier aggregations may have occurred on 70 seamounts between 46 and 62°N but only 30 of them were commercially important and subsequently exploited. The fishery is mainly conducted using pelagic trawls although on some seamounts it is possible to use bottom gear.

The greatest annual catch of roundnose grenadier (almost 30,000 t) on the MAR was taken by the Soviet Union in 1975, fluctuating in subsequent years between 2800 to 22,800 t. The fishery for grenadier declined after the dissolution of the Soviet Union in 1992. In the last 15 years, there has been a sporadic fishery by vessels from Russia (annual catch estimated at 200–3200 t), Poland (500–6700 t), Latvia (700–4300 t) and Lithuania (data on catch are not available). In 2010 Spain started new target fishery of grenadiers (*M. berglax* and *C. rupestris*) were 1618 t. In 2011 Spanish catch of roundnose grenadier already amounted 3366 t. Grenadier has also been taken as bycatch in the Faroese orange roughy fishery and Spanish blue ling and roughhead grenadier fishery. During the entire fishing period to 2011, the catch of roundnose grenadier from the northern MAR amounted to more than 236,000 t, mostly from ICES Subarea 12.

#### A.3. Ecosystem aspects

The depth in most of divisions 10.b, 12.c and sub-divisions 5.a1, 12.a1, 14.b1 is > ca 4000 m and abyssal is not exploited by fisheries. The major topographic feature is the Northern part of the MAR, located between Iceland and the Azores. Numerous seamounts of variable heights occur all long this ridge along with isolated seamounts in other areas such as Altair and Antialtair. The physical structure of seamounts often

amplify water currents and create unique hard substrata environments that are densely populated by filter-feeding epifauna such as sponges, bivalves, brittle stars, sea lilies and a variety of corals such as the reef-building cold-water coral *Lophelia pertusa*. This benthic habitat supports elevated levels of biomass in the form of aggregations of fish such as orange roughy and alfonsoinos, and a number of seamounts have been targeted by commercial fleets. Such habitats are however highly susceptible to damage by mobile bottom fishing gear and the fish stocks can be rapidly depleted due to the life-history traits of the species which are slow growing and longer-living than non-seamount species.

The MAR is isolated from the continental slope except for the relatively continuous shallower connections via the Greenland and Scotland ridges, and some seamount chains, e.g. the New England seamounts. Along with much of the general biology, the intraspecific status of species inhabiting the MAR is unclear. Based on geographical patterns it is probable that MAR populations of both fish and benthic organisms are isolated from the others in the North Atlantic and endemism.

## **B. Data**

### **B.1. Commercial catch**

Landings time-series data per ICES Subareas are available for whole fishery period. Landings by ICES division are available by countries. Landings data by ICES statistical rectangle are not available

Catch in Subarea 12 are allocated to MAR (Divisions 12.a,c) and western Hatton Bank (12.b) according to knowledge of the fisheries from WG members.

There were no discards of roundnose grenadier on Russian trawlers where smallest fish and waste were used for fish meal processing. There is no information on discards by other countries vessels.

### **B.2. Biological data**

Size frequency data (total length distribution) for roundnose grenadier are available for Russian catches for 1972-1990 (Shibanov 1997). Age estimates were available from Russia for 1974-1990 (Shibanov 1997).

According to retrospective Russian data maturation of roundnose grenadier starts when fish are at least 50 cm long Total length. Mean length-at-maturity of males and females being 76 and 79 cm (TL) respectively (Savvatimsky 1992). Some individuals mature at the age 6, though some fish may remain immature until the age 20 (Savvatimsky 1969; Shibanov 1985). No new data on maturity has been collected in recent years.

No specific information is available from the Mid-Atlantic Ridge but natural mortality of 0.1 has been used for roundnose grenadier in 5.b, 6, 7 and 12.b since 2002. This is based on catch curves from pre exploitation surveys.

### **B.3. Surveys**

There have been number of investigations from the Soviet Union on the northern MAR in the 1972-1990 including trawl acoustic surveys and underwater observations (Shibanov et al 2002). According to surveys data and analytical assessments in the 1970-1980s a stock size was estimated as 400,000-800,000 t (Baidalinov, 1986; Pavlov et al.,

1991; Shibarov, 1997). In the 1990s no researches of roundnose grenadier were conducted in the area.

In recent years the MAR-ECO project yielded some biological data (length, age maturity) for roundnose grenadier on the northern MAR.

Trawl acoustic surveys on the MAR were resumed in 2003, when Russian R/V *Atlantida* investigated area between 47° and 58°N. According to results of this survey the biomass of the pelagic component of the grenadier only amounted to about 130,000 t (Gerber et al., 2004). It was concluded that the depths of aggregations and the number of small immature fish may have increased as compared to 1970-1980s. Last conclusion was related primarily to northern part of surveyed area (50-58°N).. Similar research were carried out again in 2010 in the area between 44° and 50°N (Shnar *et al* 2011).

#### B.4. Commercial cpue

Only nominal catch per fishing day are available from the Soviet/Russian official data from 1974 to 2010. There are gaps in the series due to the lack of catch statistics for 1973 and 1982 as well as absence or too limited of target fishery in 1994-1995 and 2006-2010. These data must be treated with caution because catch rates might be sensitive to several factors (distribution of pelagic concentrations, experience of vessel crew, environmental conditions, etc.) that could not be taken in account so far.

#### B.5. Other relevant data

### C. Assessment: data and method

#### D. Short-term projection

#### E. Medium-term projections

#### F. Long-term projections

##### Biological Reference Points

	TYPE	VALUE	TECHNICAL BASIS
MSY	MSY Btrigger	xxx t	Explain
Approach	FMSY	Xxx	Explain
	Blim	xxx t	Explain
Precautionary	Bpa	xxx t	Explain
Approach	Flim	Xxx	Explain
	Fpa	Xxx	Explain

The current data are inappropriate to provide MSY estimates.

#### H. Other issues

Because of the particular environmental conditions on the MAR and roundnose grenadier occurring in large concentration, unlike in other areas where it is rather a dispersed species, it may remain impossible to assess the biomass reliably without extensive acoustic surveys.

## I. References

- Allain, V. 2001. Reproductive strategies of three deep-water benthopelagic fishes from the northeast Atlantic Ocean. *Fisheries Research*, 51: 165-176.
- Bergstad, O. A., and Gordon, J. D. M. 1994. Deep-water ichthyoplankton of the Skagerrak with special reference to *Coryphaenoides rupestris* Gunnerus, 1765 (Pisces, Macrouridae) and *Argentina silus* (Ascanius, 1775) (Pisces, Argentinidae). *Sarsia*, 79: 33-43.
- Gerber, E. M., S. N. Burykin, A. V. Zimin, A. V. Oleinik, and V. T. Soldat. 2004. Russian fishery researches in the Mid-Atlantic Ridge area in 2003. Working Document to the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources, 18–24 February 2004, Copenhagen, Denmark. ICES Headquarters, Copenhagen, Denmark.
- Kelly, C. J., Connolly, P. L., and Bracken, J. J. 1996. Maturity, oocyte dynamics and fecundity of the roundnose grenadier from the Rockall Trough. *Journal of Fish Biology*, 49: 5-17.
- Kelly, C. J., Connolly, P. L., and Bracken, J. J. 1997. Age estimation, growth, maturity and distribution of the roundnose grenadier from the Rockall Trough. *Journal of Fish Biology*, 50: 1-17.
- Knutsen, H., Jorde, P. E., Skogen, M., and Bergstad, O. A. 2010. Population structure in the deep sea fish, roundnose grenadier (*Coryphaenoides rupestris*), as revealed by microsatellite DNA. 12th International Deep-sea Biology Symposium, Reykjavik, Iceland, 7-11 June 2010.
- Savvatimsky, P. I. 1992. Systematical position, biology and fishery significance of the roundnose grenadier. In: Researches of the North Atlantic biological resources. Selected papers. PINRO, Murmansk: 251–264 (In Russian).
- Shibanov, V. N. 1985. Peculiarities of the roundnose grenadier reproduction in the North Atlantic. Studying and conservation of the biological resources in the North Seas and the North Atlantic. In: Scientific conference of Russian scientists and specialists. Abstracts of papers. PINRO, Murmansk: 71 (In Russian).
- Savvatimsky, P. I. 1969. Roundnose grenadier of the North Atlantic. PINRO, Murmansk, 72 (in Russian).
- Shibanov V. N. 1997. Biological foundation of roundnose grenadier (*Coryphaenoides rupestris* Gunnerus, 1765) fishery in the North Atlantic. Candidate Dissertation in Biological Sciences. Murmansk, PINRO: 156 (in Russian).
- Shibanov V. N., Vinnichenko V. I. 2007. Biology and fishery of roundnose grenadier (*Coryphaenoides rupestris* Gunnerus 1765) in the North Atlantic/ *In press*.
- Shibanov V. N., V. I. Vinnichenko, A. P. Pedchenko. 2002. Russian investigations and fishing in the northern part of the Mid-Atlantic Ridge. ICES CM 2002/L: 35.
- Shnar V. N., A. M. Safronov and A. P. Malyshko. 2011. Russian research of roundnose grenadier in the Mid-Atlantic Ridge area during 2010. Working Document to the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources, 2–8 March 2011, Copenhagen, Denmark. ICES Headquarters, Copenhagen, Denmark.
- White, T. A., Stamford, J., and Hoelzel, A. R. 2010. Local selection and population structure in a deep-sea fish, the roundnose grenadier (*Coryphaenoides rupestris*). *Molecular Ecology*, 19: 216-226.