Species Description 2021: *Dissostichus mawsoni*

CCAMLR Secretariat

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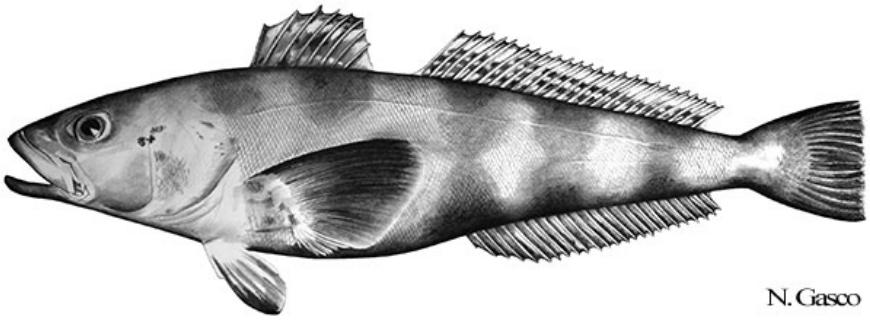
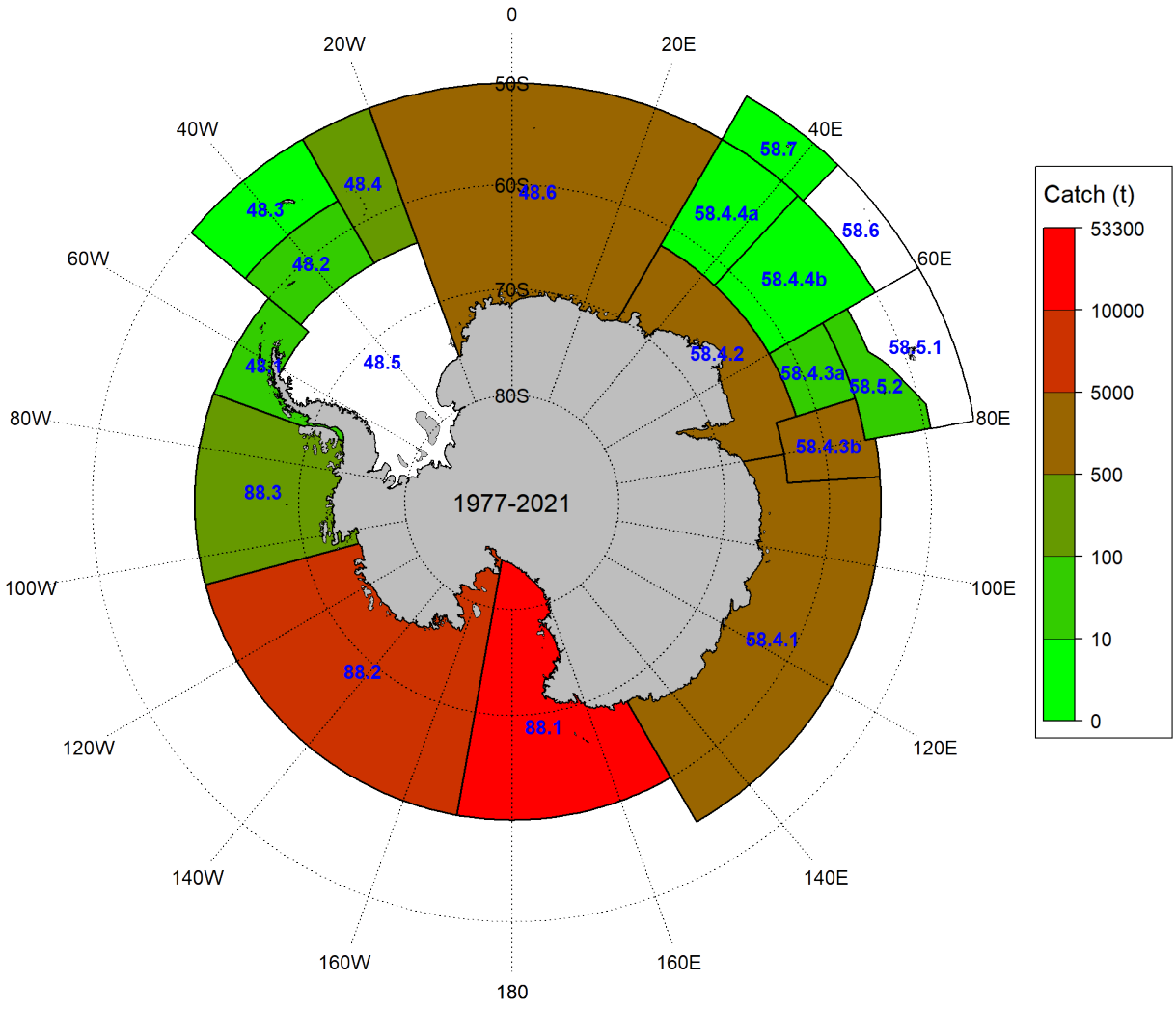


Antarctic toothfish *Dissostichus mawsoni* Norman, 1937.

Distribution of reported catch



Distribution of reported catch of *Dissostichus mawsoni* at the ASD scale. (Source: C2 data).

Life-history

Dissostichus mawsoni (Antarctic toothfish) is characterised by slow growth, low fecundity and late maturity. It has a cricumpolar distribution, typically south of 60°S, although it occurs further north, associated with colder, typically deeper, water, in Subareas 48.6 and 88.1. Analyses of the genetic diversity for *D. mawsoni* has found generally weak genetic variation between the areas 48, 58 and 88. *D. mawsoni* appears to have protracted spawning periods, taking place mainly in winter, but which may start as early as late autumn and extend into spring. However, as this is the period least accessible to fishing, and thus the collection of biological data, knowledge of specific life-history traits for this species is limited. Depending on the exact location of spawning, eggs and larvae become entrained by the gyres with juvenile fish being found on the continental slope and shelf. As these juveniles grow in size they move out into deeper water feeding in the slope region in depths of 1,000-1,500m, where they gain condition before spawning. fish may remain in the northern area for up to two or three years, although this pattern may be different for males versus females. They may then move southwards back onto the shelf and slope where productivity is higher and food is more plentiful and where they regain condition before spawning.

The 2018 CCAMLR Workshop for the Development of a *D. mawsoni* Population Hypothesis for Area 48, suggested that defining a stock of *D. mawsoni* the spatial boundaries for a stock of toothfish, it is important that such an area includes all of the required habitat typesfor different life stages of toothfish. Accordingly, the converse suggests that an area that does not contain that range of habitats would not be considered a stock, for example the collection of sea mounts in the north of Subarea 48.6, in which there are no shelf habitats would not be considered to constitute a stock.

Biological parameters estimates

In Subarea 48.4

Estimates of natural mortality, length-mass, and tagging parameters for *D. mawsoni* in Subarea 48.4 are given in Table 1.

Table 1: Biological parameters assumed for *Dissostichus mawsoni* in Subarea 48.4.

Component	Parameter	Value	Unit
Natural mortality	M	0.13	/y
tag-induced mortality	t	0.1	/y
tag failure	f	0.0064	
Length to mass	a	1.193 x 10-5	kg/cm
	b	2.975317	

In Subarea 88.1

Estimates of natural mortality, length-mass, growth and maturity parameters for *D. mawsoni* in Subarea 88.1 are given in Table 2.

Table 2: Biological parameters assumed for *Dissostichus mawsoni* in Subarea 88.1.

Relationship	Parameter	Male	Female
Natural mortality	M (/y)	0.13	0.13
Von Bertalanffy	t0 (y)	-0.292	-0.712
	k (/y)	0.101	0.082
	L_inf (cm)	164.06	180.49
	c.v.	0.101	0.101
Length-weight	a (t/cm)	1.247 x 10-8	7.361 x 10-9
	b	2.99	3.105
Age at maturity (y)	A50	11.99	16.92
Stock recruit steepness (Beverton-Holt)	h		0.75
Recruitment variability	sigmaR		0.6
Ageing error (CV)	cv		0.1
Initial tagging mortality			10%
Initial tag loss (per tag)			3.30%
Instantaneous tag loss rate (per tag)			0.062/y
Tag detection rate			99.30%
Tag related growth retardation			0.5 y

Relevant Conservation Measures

In addition to Conservation Measures that apply to all Areas and all Species, the following Conservation Measures apply:

Description	Species	Area	Conservation Measure
Limits on the exploratory fishery for Dissostichus mawsoni in Statistical Subarea 48.6 in the 2021/22 season	*Dissostichus mawsoni*	Subarea 48.6	CM 41-04
Limits on the exploratory fishery for Dissostichus mawsoni in Statistical Division 58.4.2 in the 2021/22 season	*Dissostichus mawsoni*	Division 58.4.2	CM 41-05
Limits on the exploratory fishery for Dissostichus mawsoni on BANZARE Bank (Statistical Division 58.4.3b) outside areas of national jurisdiction in the 2021/22 season	*Dissostichus mawsoni*	Division 58.4.3b	CM 41-07
Limits on the exploratory fishery for Dissostichus mawsoni in Statistical Subarea 88.1 in the 2021/22 season	*Dissostichus mawsoni*	Subarea 88.1	CM 41-09
Limits on the exploratory fishery for Dissostichus mawsoni in Statistical Subarea 88.2 in the 2021/22 season	*Dissostichus mawsoni*	Subarea 88.2	CM 41-10
Limits on the exploratory fishery for Dissostichus mawsoni in Statistical Division 58.4.1 in the 2021/22 season	*Dissostichus mawsoni*	Division 58.4.1	CM 41-11
Catch Documentation Scheme for Dissostichus spp.	*Dissostichus spp.*	All Areas	CM 10-05
Prohibition on fishing for Dissostichus spp. in depths shallower than 550 m in exploratory fisheries	*Dissostichus spp.*	All Areas	CM 22-08
Prohibition of directed fishing for Dissostichus spp. except in accordance with specific conservation measures in the 2021/22 season	*Dissostichus spp.*	Subarea 48.5	CM 32-09
General measures for exploratory fisheries for Dissostichus spp. in the Convention Area in the 2021/22 season	*Dissostichus spp.*	All Areas	CM 41-01
Limits on the fishery for Dissostichus spp. in Statistical Subarea 48.4 in the 2021/22 season	*Dissostichus spp.*	Subarea 48.4	CM 41-03

References

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Kuhn, K.L. and P.M. Gaffney. 2008. Population subdivision in the Antarctic toothfish (*Dissostichus mawsoni*) revealed by mitochondrial and nuclear single nucleotide polymorphisms (SNPs). Ant. Sci., 20: 327-338.

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Smith, P.J. and P.M. Gaffney. 2005. Low genetic diversity in the Antarctic toothfish (*Dissostichus mawsoni*) observed with mitochondrial and intron DNA markers. CCAMLR Science, 12: 43-51.

Additional Resources

- Fishery Summary for Subarea 48.2: pdf, html
- Fishery Summary for Subarea 48.4: pdf, html
- Fishery Summary for Subarea 48.6: pdf, html
- Fishery Summary for Division 58.4.1: pdf, html
- Fishery Summary for Division 58.4.2: pdf, html
- Fishery Summary for Division 58.4.3b: pdf, html
- Fishery Summary for Subarea 88.1: pdf, html
- Fishery Summary for Subarea 88.2: pdf, html
- Fishery Summary for Subarea 88.3: pdf, html
- Fisheries Documents Browser