Species Description 2021: *Dissostichus eleginoides*

CCAMLR Secretariat

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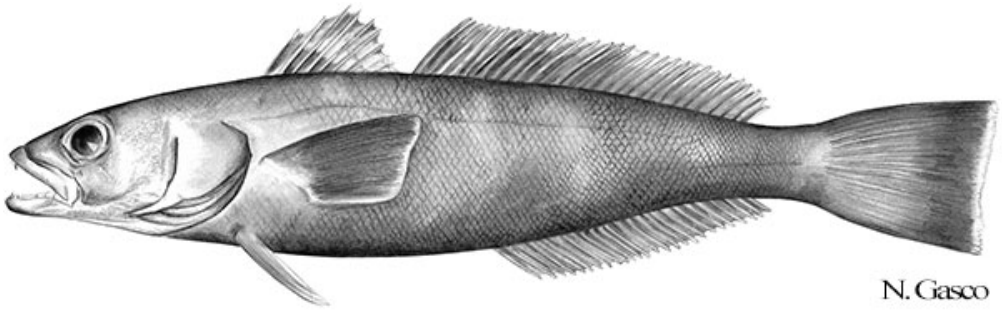
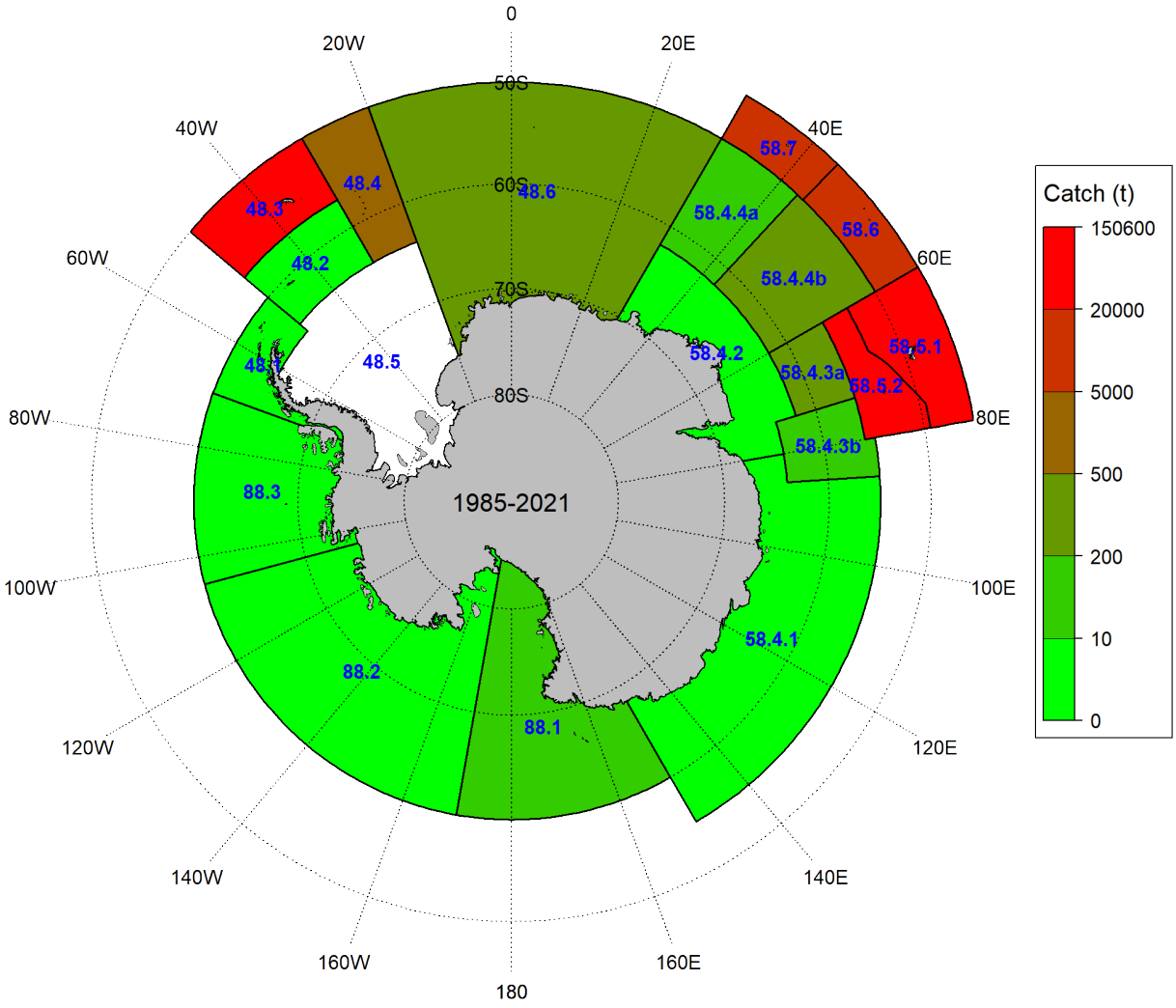


Patagonian toothfish *Dissostichus eleginoides* Smitt, 1898.

Distribution of reported catch



Distribution of reported catch of *Dissostichus eleginoides* at the ASD scale. (Source: C1 and C2 data).

Life-history

Dissostichus eleginoides (Patagonian toothfish) is a large long-lived species belonging to the family Nototheniidae, or Antarctic cods, characterised by slow growth, low fecundity and late maturity. *Dissostichus eleginoides* appears to have protracted spawning periods, taking place mainly in winter, but which may start as early as late autumn and extend into spring. *Dissostichus eleginoides* are thought to spawn in deep water around sub-Antarctic islands, around South Georgia Island (Subarea 48.3), Bouvet Island (Subarea 48.6), Prince Edward Islands (Subarea 58.7) and on the Kerguelen Plateau (Divisions 58.5.1 and 58.5.2), but data in Crozet Islands (Subarea 58.6) are still not available. Patagonian toothfish show distinct depth preferences with age, with juveniles (<50 cm) living on the continental shelf and moving into deeper water (>500 m) as they reach maturity (~90 cm). They are associated with cold water and are found around the sub-Antarctic and South America, as far north as Equador in the cold Humboldt current. They are important predators, feeding primarily on fish, cephalopods and crustaceans; they also scavenge.

Biological parameters estimates

In Subarea 48.3

The biological parameters (Table 1) used in the Subarea 48.3 stock assessment are taken from the scientific literature, where available. These values are derived from analyses of the biological data collected by scientific observers on board fishing vessels. Where derived values are not available (*e.g.*, natural mortality and the steepness of the stock and recruit relationship), values have been assumed that are consistent with those used in other toothfish assessments conducted by CCAMLR.

Table 1: Biological parameters assumed for *Dissostichus eleginoides* in Subarea 48.3.

Component	Parameter	Value	Unit
Natural mortality	M	0.13	/y
VBGF	K	0.08	/y
VBGF	t0	-0.7	y
VBGF	L_inf	126	cm
Length to mass	A	2.54 x 10-9	t/cm
	B	2.8	
Maturity range		1 to 23	
Tag-related growth retardation		0.75	
CASAL tag-loss rate		0.006377	
Immediate tagging survivorship		Applied as a vector to length-based tag-release data	
Tag probability of detection		1	
Stock-recruit relationship steepness	H	0.75	
Lognormal recruitment SD		Estimated	

In Subarea 48.4

The biological parameters (Table 2) used in the Subarea 48.4 stock assessment are taken from the scientific literature, where available. These values are derived from analyses of the biological data collected by scientific observers on board fishing vessels. Where derived values are not available (*e.g.*, natural mortality and the steepness of the stock and recruit relationship), values have been assumed that are consistent with those used in other toothfish assessments conducted by CCAMLR.

Table 2: Biological parameters assumed for *Dissostichus eleginoides* in Subarea 48.4.

Component	Parameter	Value	Unit
Natural mortality	M	0.13	/y
VBGF	K	0.054	/y
	t0	0	y
	L_inf	202	cm
Length to mass	a	4.091 x 10-9	t/cm
	b	3.196	
Maturity range		1 to 23	
Tag-related growth retardation		0.75	
CASAL tag-loss rate		0.0064	
Immediate tagging survivorship		0.9	
Tag probability of detection		1	
Stock-recruit relationship steepness	h	0.75	
Lognormal recruitment SD		estimated	

In Division 58.5.1

The biological parameters used in the Division 58.5.1 stock assessment are shown in Table 3.

Table 3: Biological parameters assumed for *Dissostichus eleginoides* in Division 58.5.1.

Component	Parameter	Value	Unit
Natural mortality	M	0.155	/y
VGBF	K	0.0662	/y
	t0	-1.12	y
	L_inf	170	cm
Length to mass	A	9.61 x 10-9	
	B	3.02	
Maturity	A50	9.25	
	Ato95	8.07	
Stock recruit steepness (Beverton-Holt)	h	0.75	
Tag detection		0.999	
Tag-release M		0.1	/y
Tag related growth retardation		0.5	y
Tag shedding		0.004	

In Division 58.5.2

The biological parameters used in the Division 58.5.2 stock assessment are shown in Table 4.

Table 4: Biological parameters assumed for *Dissostichus eleginoides* in Division 58.5.2.

Component	Parameter	Value	Unit
Natural mortality	M	0.155	/y
VBGF	K	0.061	/y
	t0	-3.13	y
	L_inf	1465	mm
Length to mass	A	3.61 x 10-12	t/mm
	B	3.1518	
Stock recruit steepness (Beverton-Holt)	h	0.75	

In Subarea 58.6

The biological parameters used in the Subarea 58.6 stock assessment are shown in Table 5.

Table 5: Biological parameters assumed for *Dissostichus eleginoides* in Subarea 58.6.

Component	Parameter	Value	Unit
Natural mortality	M	0.155	/y
VGBF	K	0.039	/y
	t0	-2.3	Y
	L_inf	197.55	cm
Length to mass	A	6.699 x 10-9	
	B	3.095	
Maturity	A50	9.25	
	Ato95	8.07	

In Subarea 58.7

There are no specific life-history parameters for *D. eleginoides* in the South African EEZ. However, for the purposes of stock assessment, the parameters estimated by Agnew et al. (WG-FSA-06/53) for this species in Subarea 48.3 have been adopted.

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 eleginoides on Elan Bank (Statistical Division 58.4.3a) outside areas of national jurisdiction in the 2021/22 season	*Dissostichus eleginoides*	Division 58.4.3a	CM 41-06
Limits on the fishery for Dissostichus eleginoides in Statistical Division 58.5.2 in the 2021/22 and 2022/23 seasons	*Dissostichus eleginoides*	Division 58.5.2	CM 41-08
Mesh size	*Dissostichus eleginoides, Lepidonotothen squamifrons, Notothenia rossii, Gobionotothen gibberifrons*	All Areas	CM 22-02
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

Additional Resources

- Fishery Summary for Subarea 48.2: pdf, html
- Fishery Summary for Subarea 48.3: pdf, html
- Fishery Summary for Subarea 48.4: pdf, html
- Fishery Summary for Division 58.4.3a: pdf, html
- Fishery Summary for Division 58.4.3b: pdf, html
- Fishery Summary for Division 58.4.4: pdf, html
- Fishery Summary for Division 58.5.1: pdf, html
- Fishery Summary for Division 58.5.2: pdf, html
- Fishery Summary for Subarea 58.6: pdf, html
- Fishery Summary for Subarea 58.7: pdf, html
- Fisheries Documents Browser

References

Appleyard, S.A., R. Williams and R.D. Ward. 2004. Population genetic structure of Patagonian toothfish in the West Indian Ocean sector of the Southern Ocean. CCAMLR Science, 11: 21-32.