

Spatial distribution of pelagic fish off Adélie and George V Land, East Antarctica in the austral summer 2008

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Abstract

Pelagic fish assemblages and community structure were examined along longitudinal and meridian transects off Adélie and George V Land, East Antarctica, in the austral summer 2008. Fish were sampled with an RMT 8 net principally from six discrete depth layers (0–50–100–200–500–1000–2000 m) in the oceanic zone and from three depth layers (0–50–100–200 m) over the continental shelf zone. A total of 20,281 individuals from 27 species were collected. *Pleuragramma antarcticum* was the most dominant species by number (18,710 inds), followed by *Chionodraco hamatus* (768), *Trematomus newnesi* (375), *Cyclothone microdon* (101), *Electrona antarctica* (92), *Bathylagus antarcticus* (51) and *Notolepis coatsi* (54). Cluster analysis revealed that the fish community was clearly divided at the Antarctic Slope Front into separate oceanic and shelf assemblages, being dominated by mesopelagic fish and notothenioids, respectively. The Southern Boundary of Antarctic Circumpolar Current likely restricted a more northern distribution of notothenioids in the upper 200 m. Mesopelagic fish dominated the large biomass below 500 m and notothenioids dominated that in the upper 100 m. It is considered that mesopelagic fish in the oceanic zone would unlikely be eaten by seabirds because no distinctive diel vertical migration to the surface layer was observed. In the neritic zone, notothenioids (*C. hamatus*, *T. newnesi* and *P. antarcticum*) possibly play an important role as prey items for flying seabirds, penguins and other notothenioids fish especially in the shallow depth stratum (0–100 m).

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Keywords: Pelagic fish; Community structure; East Antarctica; Mesopelagic fish; Notothenioids

1. Introduction

While krill have been identified as a key trophic component, pelagic fish are also important elements of the food web in the Southern Ocean. Among the pelagic fish, Antarctic myctophids or lantern fish have

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Table 1

Abundance (number 100 m⁻²) of fish collected off Adélie and George V Land, Indian sector, East Antarctica, by an RMT 8 in the austral summer.

Stn.	14	15	16	17	18	19	20	21	
Bathylagidae <i>Bathylagus antarcticus</i>	19.4 (2)	3.2 (1)	50.4 (6)	18.5 (4)	35.8 (7)		118.9 (24)	31.4 (7)	
Gonostomatidae <i>Cyclothone microdon</i>	139.3 (21)	48.5 (11)	127.2 (18)	64.7 (15)	35.8 (7)	30 (10)	68.2 (13)	25.3 (6)	
Paralepididae <i>Notolepis coatsi</i>	15.3 (11)	27.4 (7)	24.7 (7)	3.2 (2)	18.2 (5)	28.9 (13)	14 (3)	18.8 (4)	
Myctophidae	<i>Electrona antarctica</i>	70.7 (15)	29.7 (7)	73.7 (29)	27.7 (6)	23.3 (5)	36.5 (13)	20.1 (5)	51.3 (12)
	<i>Gymnoscopeleus braueri</i>		4.4 (1)	1.2 (1)			1.8 (1)	4.9 (1)	4.2 (2)
	<i>Krefflichthys anderssoni</i>					5.1 (1)	9.4 (3)		
	<i>Protomyctophum bolini</i>	15.3 (3)	4.4 (1)	4.3 (3)	3.2 (1)		1.6 (1)		4.9 (1)
Macrouridae <i>Cynomacrurus piriei</i>		4.4 (1)							
Melamphaidae <i>Melamphaes microps</i>					5.1 (1)				
Nototheniidae	<i>Pleuragramma antarcticum</i>								
	<i>Trematomus lepidorhinus</i>								
	<i>Trematomus newnesi</i>								
Artedidraconidae	<i>Artedidraco loennbergi</i>								
	<i>Artedidraco shackletoni</i>								
	<i>Artedidraco skottsbergi</i>								
	<i>Artedidraco</i> Type A								
	<i>Artedidraco</i> Type B						1.4 (2)		
<i>Pogonophryne</i> sp.									
Bathydraconidae	<i>Bathydraco antarcticus</i>								
	<i>Cygnodraco mawsoni</i>							3.2 (1)	
	<i>Prionodraco evansii</i>								
	<i>Racovitzia glacialis</i>							0.8 (1)	
Channichthyidae	<i>Chaenodraco wilsoni</i>								
	<i>Chionodraco hamatus</i>								
	<i>Cryodraco antarcticus</i>								
	<i>Dacodraco hunteri</i>								
	<i>Pagetopsis</i> sp.								
Total	260.0 (52)	122.0 (29)	281.5 (64)	117.3 (28)	123.3 (26)	108.2 (41)	227.5 (48)	139.9 (34)	

Abundance values represent number of fish in the 100 m² water column from surface to the maximum depth samples at each station. Number in parenthesis indicates individual number collected.

been considered as one of the key families in the oceanic realm from the subantarctic zone to the Antarctic continental shelf with their biogeographic patterns following major water masses and fronts (Piatkowski, 1989; Hulley, 1992; Koubbi et al., 2011). Some studies revealed that myctophids and notothenioids dominated oceanic and shelf zones, respectively, near the Antarctic continental shelf (Hoddell et al., 2000; Barrera-Oro, 2002; Flores et al., 2008; Van de Putte et al., 2010) but also in the subantarctic zone (Koubbi et al., 1991; Duhamel, 1998; Duhamel et al., 2000).

Several papers have studied fish assemblages in East Antarctica (Hulley et al., 1989; Hoddell et al., 2000; Donnelly et al., 2004; Moteki et al., 2009; Van de Putte et al., 2010; Koubbi et al., 2010). In the most southern part of this ocean, one species of lantern fish

Electrona antarctica dominates the mesopelagic fish fauna in terms of biomass and abundance (Greely et al., 1999). On the continental shelf, notothenioids are the dominant fish but this group has more benthic species than pelagic ones (Eastman, 2005) which was confirmed in our study area by Koubbi et al. (2010) and Causse et al. (2011). Few notothenioids have pelagic larvae (Loeb et al., 1993; North and Kellermann, 1989; Koubbi et al., 2009), whereas for others the larvae have not been described yet because of probable non-pelagic early life with parental care (Gon and Heemstra, 1990). Some icefish have larvae or juveniles linked with krill swarms (Kock, 2005), while other species are adapted to extreme conditions and are cryopelagic like *Pagothenia borchgrevinki*. Other species of notothenioids are benthopelagic or even pelagic feeding on plankton.

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