Collecting and exhibition of Antarctic organisms at Tokyo Sea Life Park

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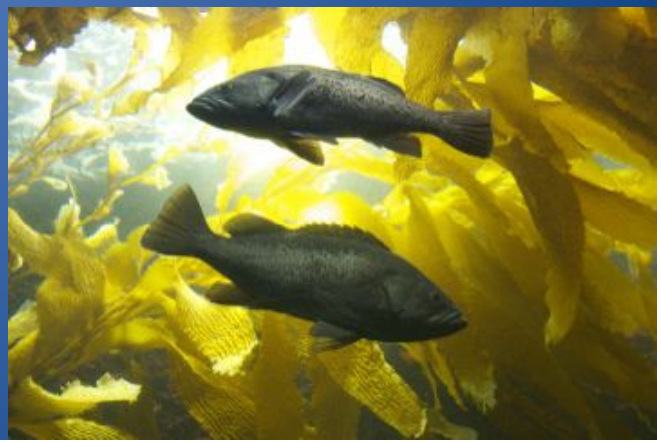
Introduction

- The theme of the Seven Seas.
- 11 collecting and researches surveys in the Antarctic region.
- 11 collecting in the Antarctic region 1988-2011





Collecting method of Antarctic organisms

1. Collecting by Tokyo Sea Life Park.
2. Bycatch of the Antarctic krill trawl fishery.
3. Cooporation of the Australian Antarctic Division.
4. Loan from the institute of Polar Research, Japan.

collecting places

1988	○
1989	○
1990	○
1991	○
1992	○
1993	○
1994	
1995	
1996	
1997	
1998	○
1999	○
2000	
2001	
2002	○
2003	
2004	○
2005	
2006	
2007	
2008	

- Collecting area : King George Island 1988-2004.

Collecting method at King George Island

- SCUBA : 6mm Dry suit
  depth : ～40m
- Trap : Bait Traps
  depth : 30-80m

- Fishing : pier of the bay.
- Hand net : At the time of low tide, walking on the shore.

Animal holding at the King George Island

- The cooler boxes (vol. 162L) were used to keep the animals.
- The boxes were placed outdoors and everyday we performed 50% water change.
- Temperature

  0 - 10 ℃
- Water temperature

  1.5 - 3.0 ℃

Animal holding
At the King George Island.

Collecting area in Antarctic

- 2011
- Antarctic krill trawl fishery operation Area : Northwest South Orkney Islands.

Bycatch of the Antarctic krill trawl fishery

- Area : Northwest of South Orkney Islands.
- Antarctic krill trawl by Fukuei-maru of Nippon Suisan Kaisha, Ltd. Fishes were collected as bycatch.
- Collected fishes were placed in the temporal holding tanks set up on the ship.

Antarctic krill trawl fishing vessel,
Fukuei-maru (5200m^3)
belong to Nippon Suisan Kaisha, Ltd.

Animal holding at the Fukuei-maru

- Holding tanks : five 72L cooler boxes
- Room temperature :

  0 - 5℃
- Water temperature :

  -1.0 - +1.6℃

holding tanks and collected animals

Transportation

Method

- Plastic bag packing :
  Putting Animals and some seawater in the plastic bag, charge oxygen gas and seal the bag with rubber bands.
- Transport boxes : We used the additional thermal insulation into the cooler boxes.
  vol.162L and vol.72L.
- To prevent the water temperature to increase , ice blocks were added in each boxes.
- A 1/3 water change.

Transportation (Route)

• Collections were transported from Punta Arenas (Chile) to Narita (Japan) via Santiago (Chile) and a city in North America by the air cargo.

• The shipping boxes were opened and re-packed once at the Santiago airport to performed a water change.

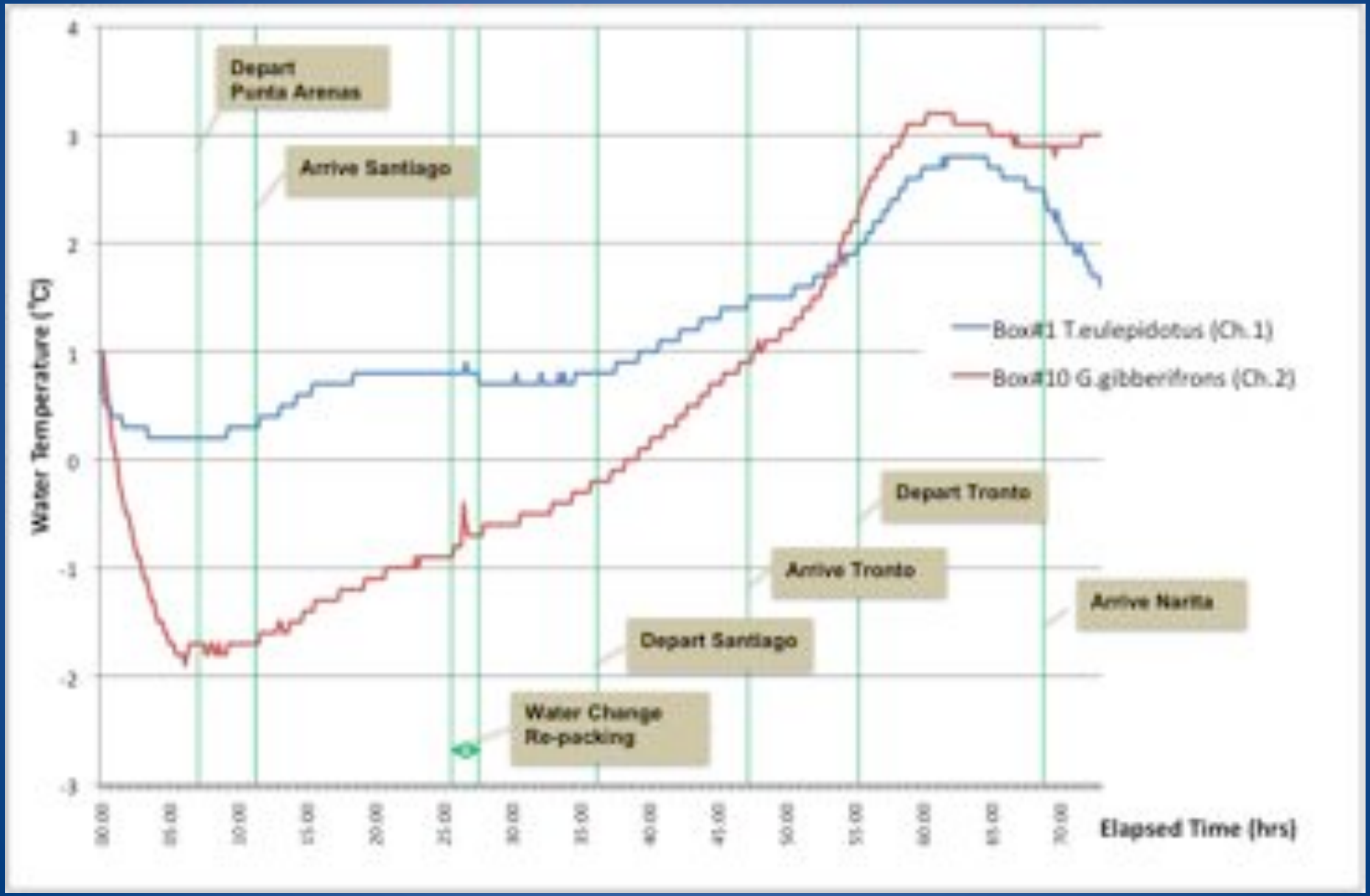
Transportation result

- It has taken 74 to 104 hours from the packing to open the boxes.

- Transport survival rate was 96% on average.

King George Is.	year	1988	1989	1990	1991	1992	1993	1998	1999	2002	2004
	survival rate	**100**	**89**	**96**	**100**	**97**	**100**	**98**	**100**	**99**	**78**
Fukuei-maru	year	2011									
	survival rate	**27**									

Water temperature data during transported from Fukuei-maru



Collected species

Chordata ★	*Lepidonotothen nudifrons*	Nemertea	*Parborlasia corrugatus*		Gammaridae sp.
(Actinopterygii)	*Notothenia coriiceps*	Mollusca	*Laternula elliptica*		Amphipoda sp.
	Notothenia rossii		*Yoldia eightsi.*	Echinodermata	*Ophionotus victoriae*
	Pagothenia borchgrevinki		*Nacella concinna*		*Ophionotus* sp.
	Trematomus newnesi		*Neobuccinum eatoni*		*Odontaster validus*
	Trematomus hansoni		*Trophon* sp.		*Sterechinus neumayeri*
★	*Trematomus eulepidotus*		*Margarella antarctica*		Spatangoida sp.
	Trematomus bernacchii		*Harpovoluta charcoti*		Dendrochirotida spp.
	Harpagifer antarcticus		Neogastropoda spp.		Holothuroidea sp.
★	*Chionodraco rastrospinosus*		Nudibranchia spp.	Chordata	*Distaplia cylindrica*
Porifera	*cf. Dendrilla* sp.	Annelida	Cirratulidae sp.	(Urochordata)	Ascidiacea spp.
	cf. Ciocalypta sp.		Sabellida sp.	Algae	*Desmarestia anceps*
	Demospongiae spp.	Arthropoda	Pantopoda spp.		*Desmarestida ligulata*
Cnidaria	*Isotealia antarctica*		*Glyptonotus antarcticus*		*Desmarestida willii*
	Urticinopsis antarctica		Serolis spp.		*Leptosomia simplex*
	Pennatulacea spp.		Paraceradocus sp.		*Iridaea chordata*
Brachiopoda	Brachiopoda sp.		Rhodophyta spp.		*Ascoseira mirabilis*

Exhibition and Holding systems

tank	Quantity	℃	salinty	pH	NO3-N mg/L	main animals
Exhibition-1	1.1m^3	1.4-2.1	33.21-34.60	7.92-8.15	0.15-0.24	*Notothenia coriiceps*
Exhibition-2	0.9m^3	1.2-1.6	34-34.58	7.05-8.04	0.16-0.69	*Glyptonotus antercticus*
Holding system1	1.5m^3	1.2-1.8	33.78-34.46	7.95-7.98	1.4-2.0	*Neobuccinum eatoni*
Holding system2	1.5m3	1.2-1.8	30.17-34.52	7.85-7.88	0.99-3.2	*Sterechinus neumayeri*
Holding system3	2.4m^3	0.8-1.4	33.78-34.54	7.87-7.96	0.22-1.5	*Harpagifer antarcticus*
Holding system4	0.9m^3	1.6-2.1	34.11-34.73	7.85-8.04	0.26-1.6	*Notothenia coriiceps*

Husbandry & Reproduction

- *Notothenia coriiceps*

species	year
Notothenia coriiceps	>20
Isotealia antarctica	>20
Parborlasia corrugatus	>20
Neobuccinum eatoni	>18
Harpagifer antarticus	>8
Lepidonotothen nudifrons	>8
Nacella concinna	>8
Harpovoluta charcoti	>8

Species	spawning	>one year
Notothenia coriceps	○	
Harpagifer antarcticus	○	○
Serolis sp	○	○
Glyptonotus antercticus	○	○
Neobuccinum eatoni	○	○
Panerozonia sp	○	○

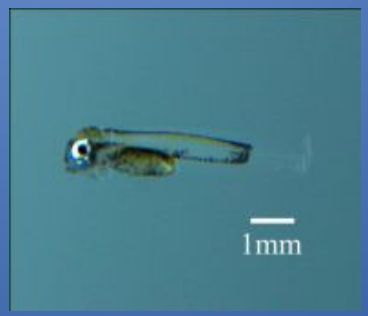
Exhibition and Observation 1.

Exhibition and Observation 2.

Spawning of *Harpagifer antarcticus* .

The egg guarding behaviors and the egg hatchings have been observed in either the exhibit tank or holding tank every year for more than 5 years.

- We had successfully grown 8 fishes.



Harpagifer antarcticus

The larvae-carrying behavior 1.

The larvae-carrying behaviors 2.