Inter-calibration of micronekton sampling gears during the 2005 MIE-II cruise

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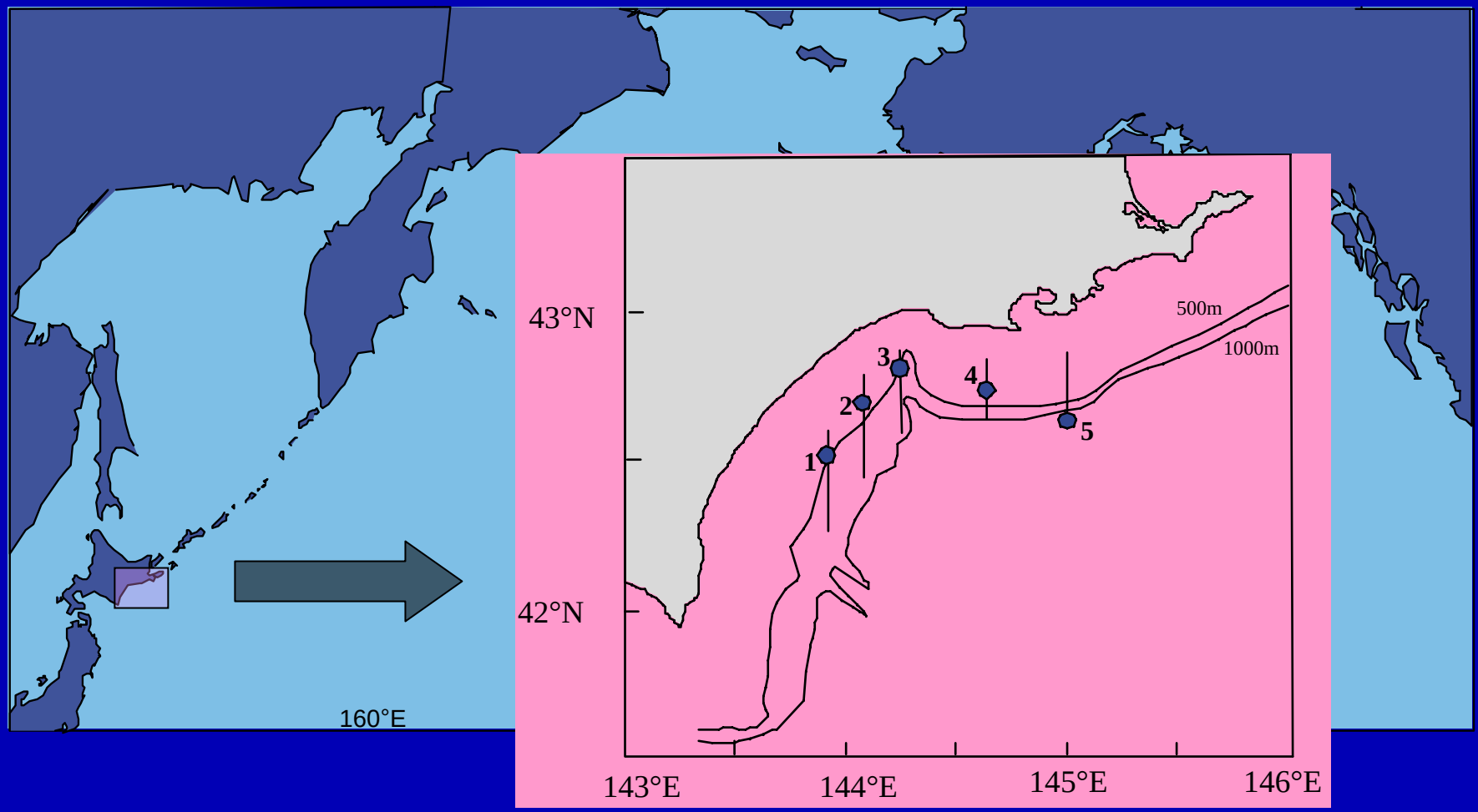
- MIE-I: off Hawaii
  - High diversity and Low density mesopelagic fauna
  - Gears compared
    - Tucker trawl
    - IKMT
    - FMT (HUFT)
    - Cobb trawl

MIE-II

- September 23 - October 3, 2005
- R/V Hokko-maru (HNFRI, 904t)
- Doto area (off SE Hokkaido Island)
- Participants
  - HNFRI, TNFRI, HU
- Gears tested:
  - MOCNESS-10
  - MOHT
  - FMT (3mm and 9mm mesh)
  - Otter Trawl + Multisampler (opening/closing codend)
  - Acoustic backscattering --> Yasuma et al.

Area surveyed



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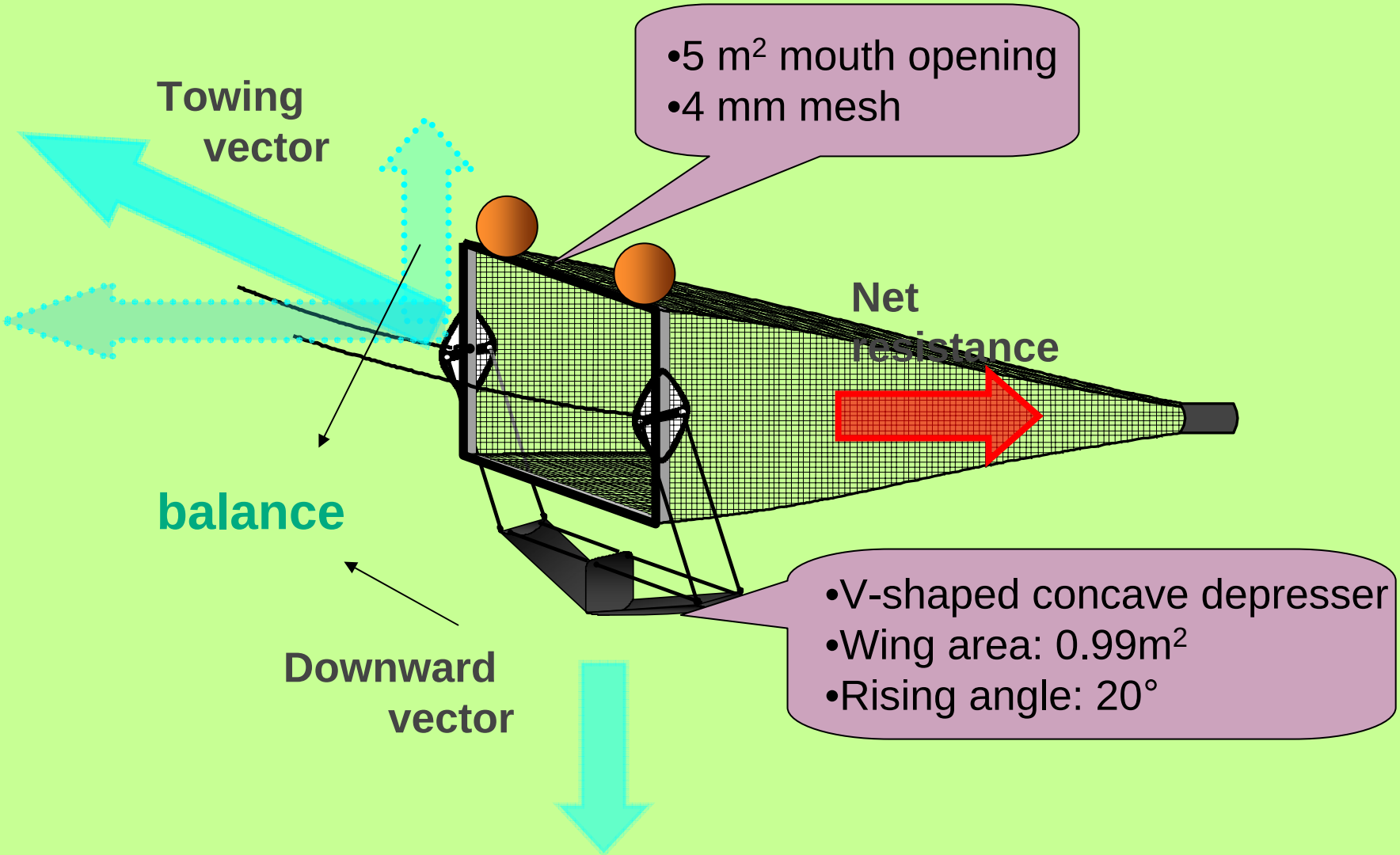
MOHT: Matsuda-**O**ozeki-**H**u **T**rawl (Oozeki et al., 2004)



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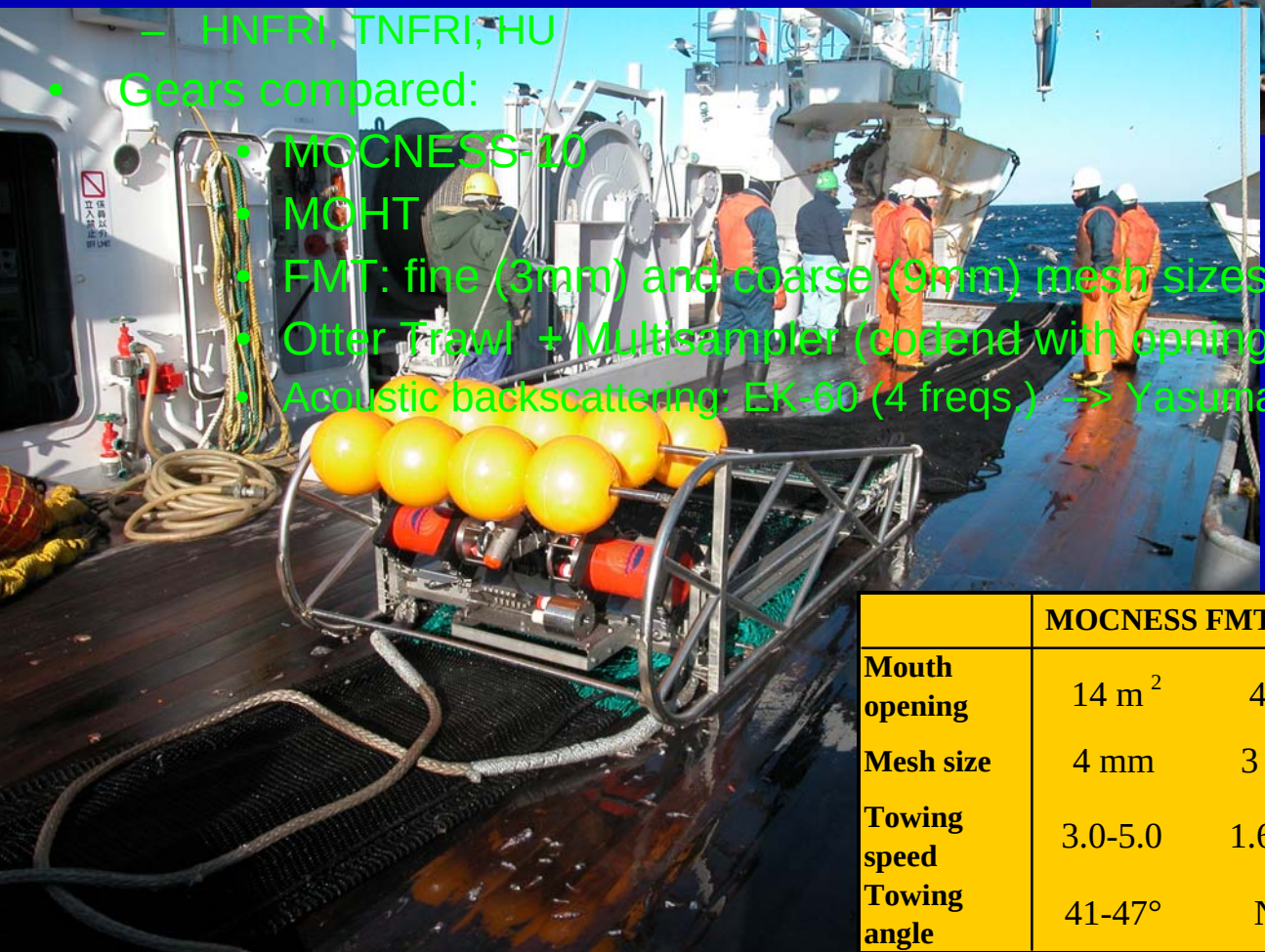
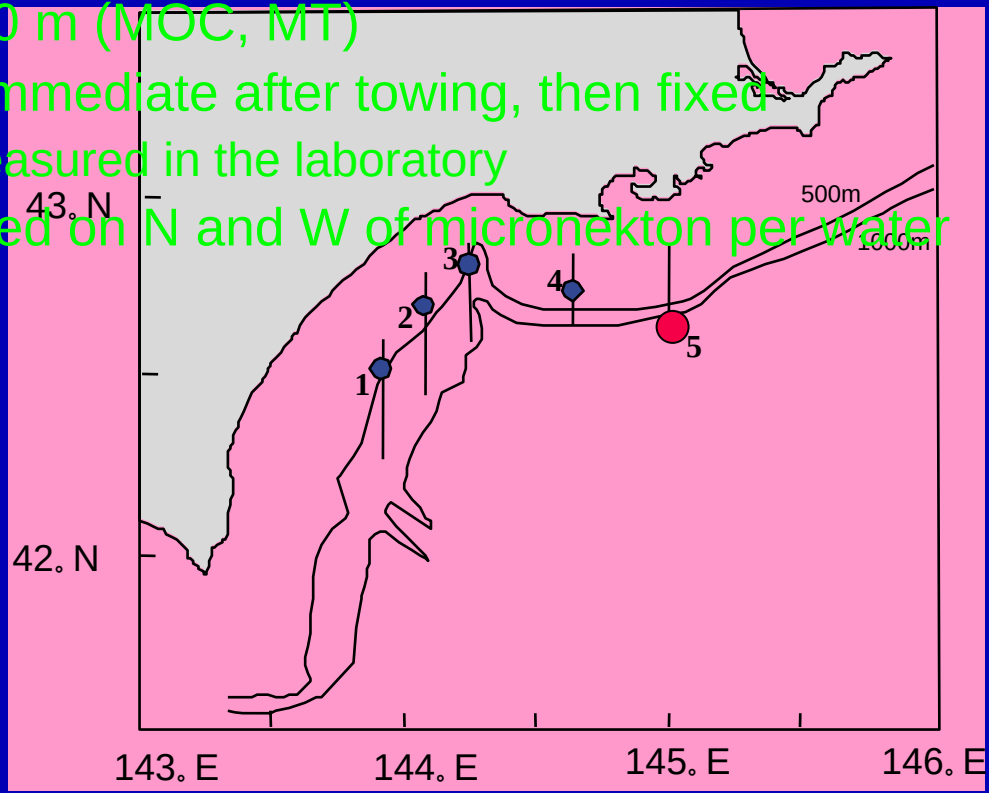


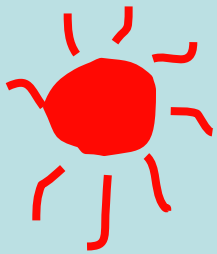
	MOCNESS	FMT-Coarse	FMT-Fine	MOHT	Otter Trawl
Mouth opening	14 m^2	4 m^2	4 m^2	5 m^2	*c*. 900 m^2
Mesh size	4 mm	3 mm	9 mm	4 mm	9 mm
Towing speed	3.0-5.0	1.6-3.0	1.0-3.0	1.3-2.0	2.6-3.0
Towing angle	41-47°	N/A	N/A	8°	-

Comparison procedure

- D/N sampling at 4 stns.
- At shelf edges (BD: 385-480m, x = 444m) –
- Otter trawl: daytime only (n = 2)
- Oblique tows aiming at 300 m (MOHT, FMT)
- Discrete sampling from 300 to 0 m (MOC, MT)
- Samples were roughly sorted immediate after towing, then fixed
- Identified, counted, weighted & measured in the laboratory
- Catchability was assessed based on N and W of micronekton per water volume filtered



Consequence of towing operations

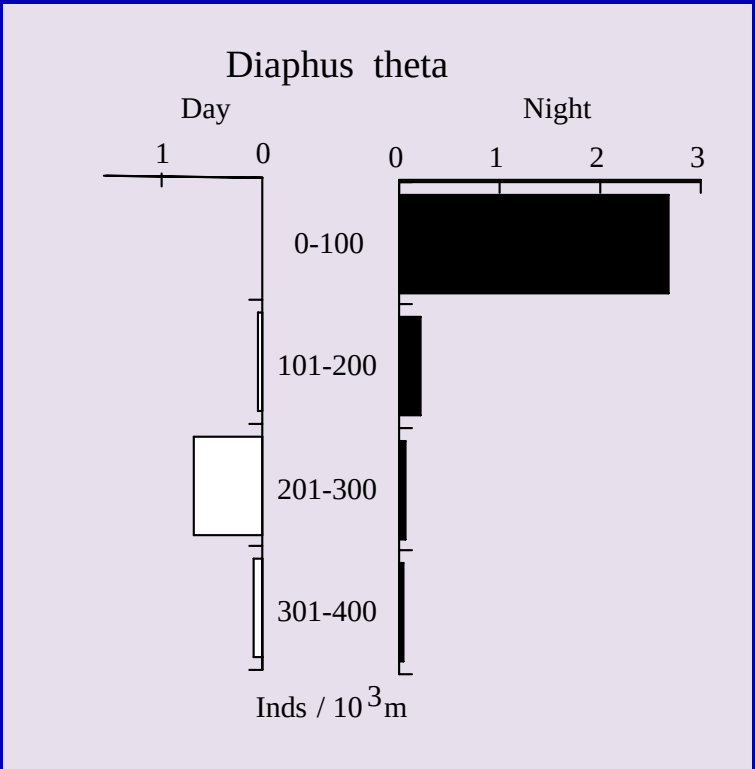


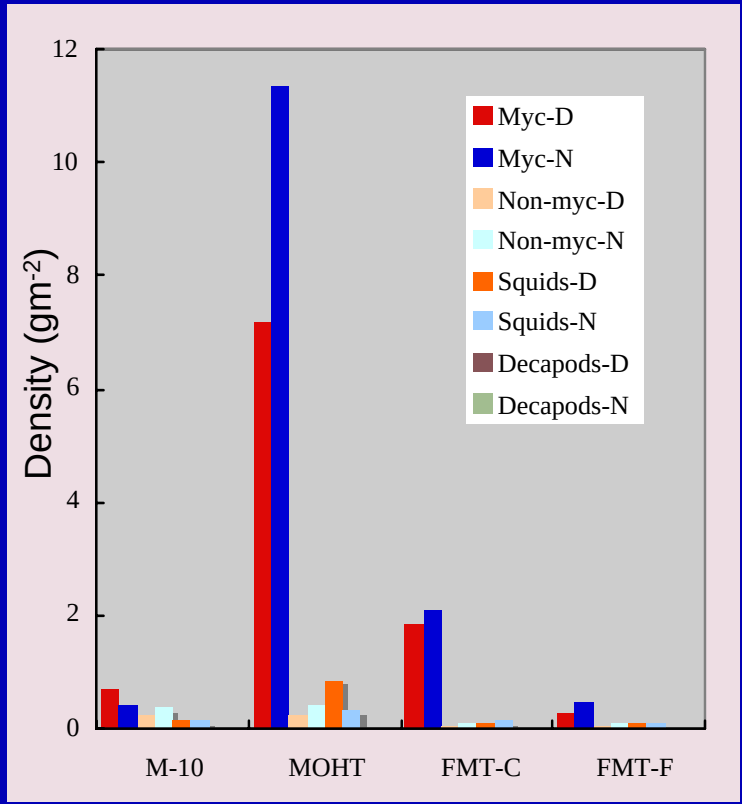
Stn 1		Stn 2		Stn 3		Stn 4	
Sep. 25	Sep. 26		Sep. 27	Sep.28	Sep.29	Oct. 1	Oct. 2
MOC	MOC	FMT		MOC	FMT	MOC	FMT
MOHT		MOHT		MOHT	MT		MOHT
FMT		MT					

FMT	MOC	FMT	MOHT	FMT	MOC	MOHT	
MOHT		MOHT	MOC			FMT	
MOC							

Catch composition

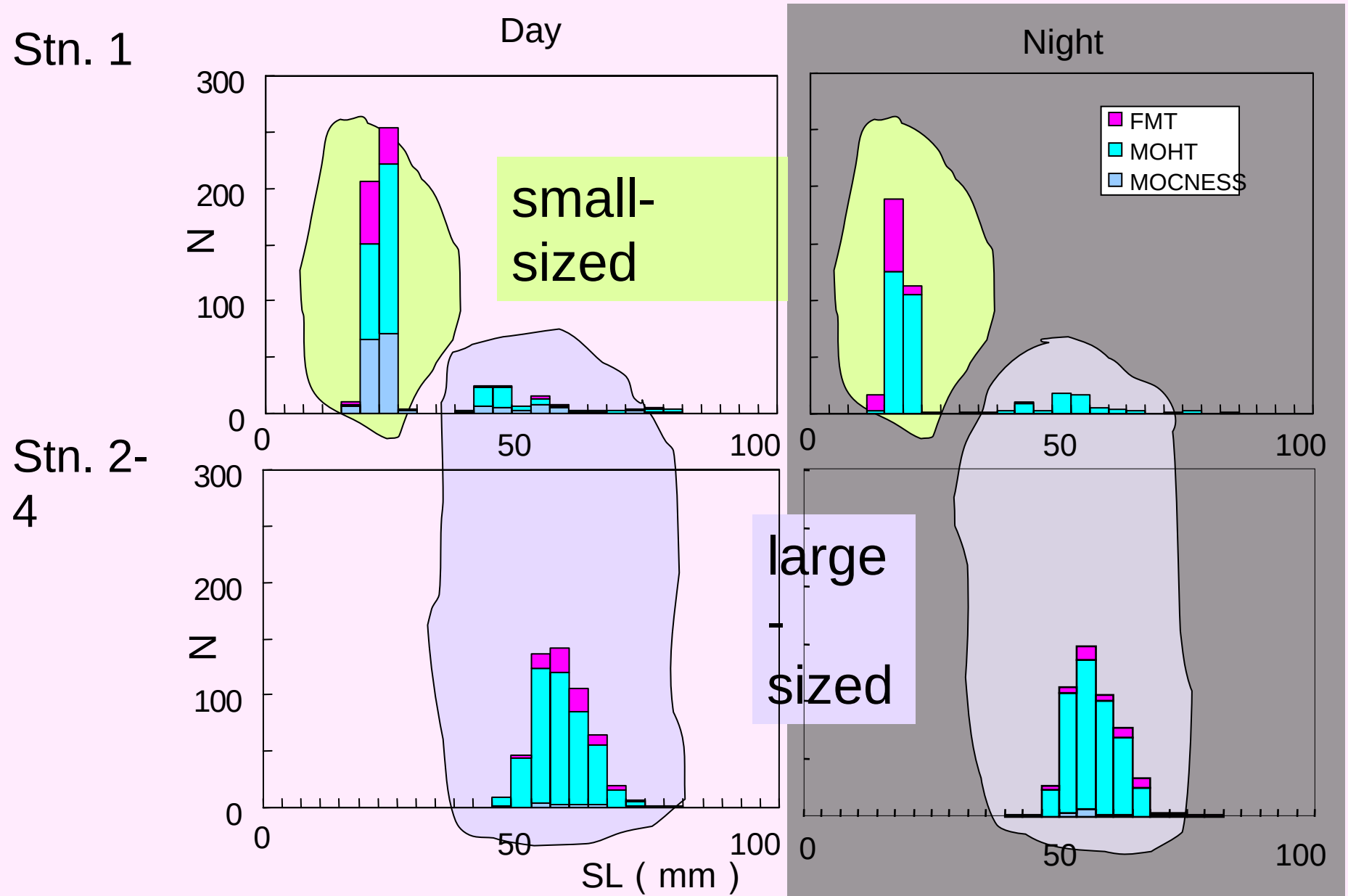
- Myctophids, especially *Diaphus theta* dominated the overall catch (82% in N and 71% in W),
- reflecting the depth sampled (0-300m)
- Gears were compared using the catches of *D. theta*





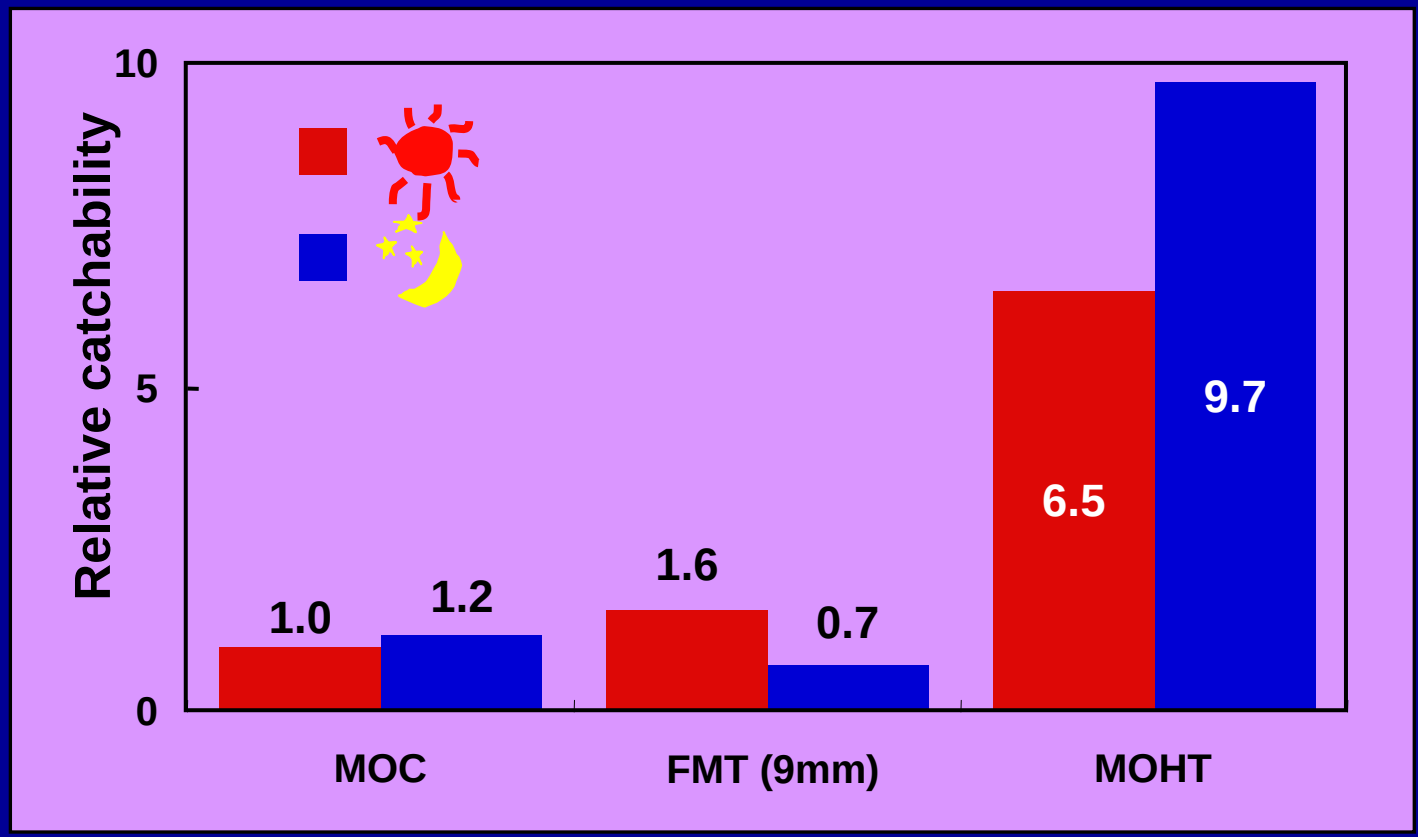
Catch composition

Body length frequency distribution of *D. theta*



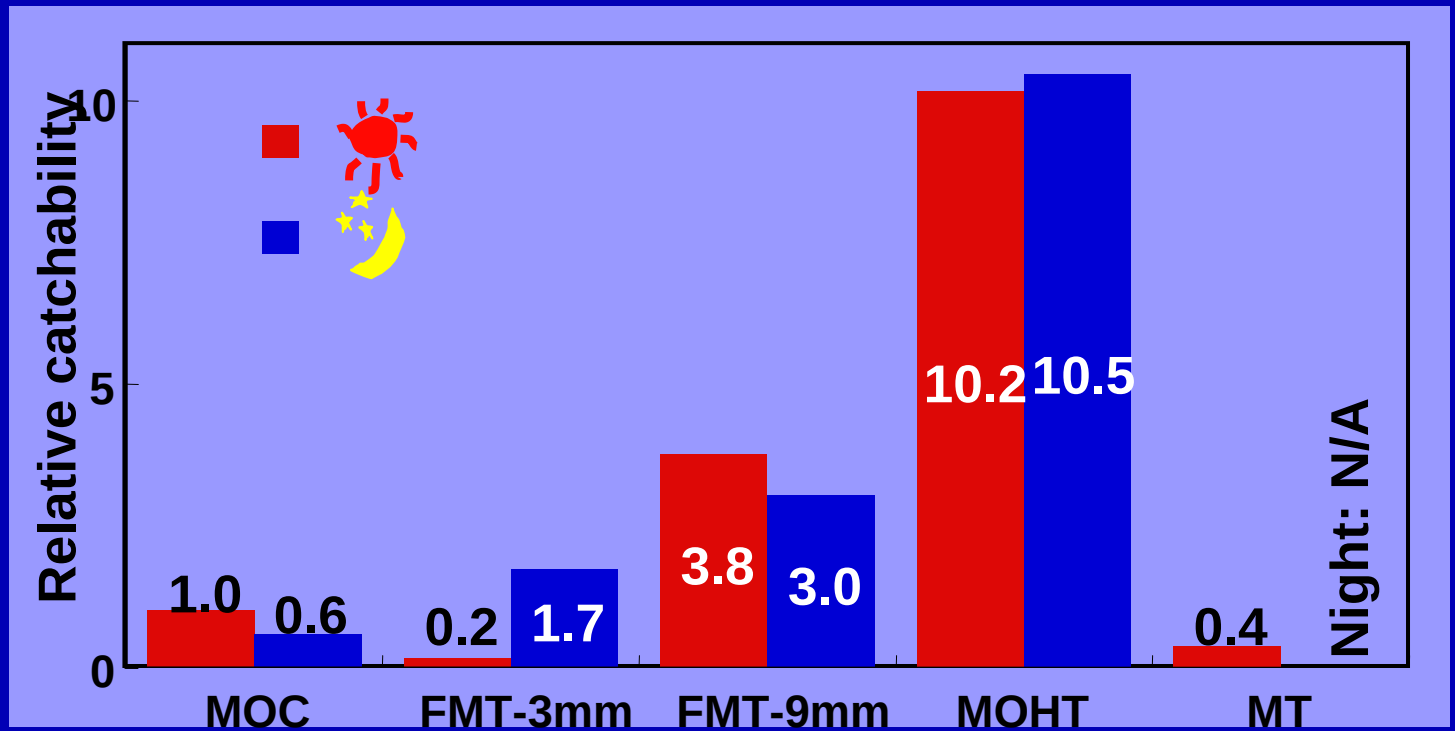
Catchability for small-sized fish (≤40 mm, Stn. 1)

- N of fish per vol of water filtered at Stn. 1
- Relative measure with MOC (D) = 1.0
- MOC ≅ FMT << MOHT
- No or slight day/night difference



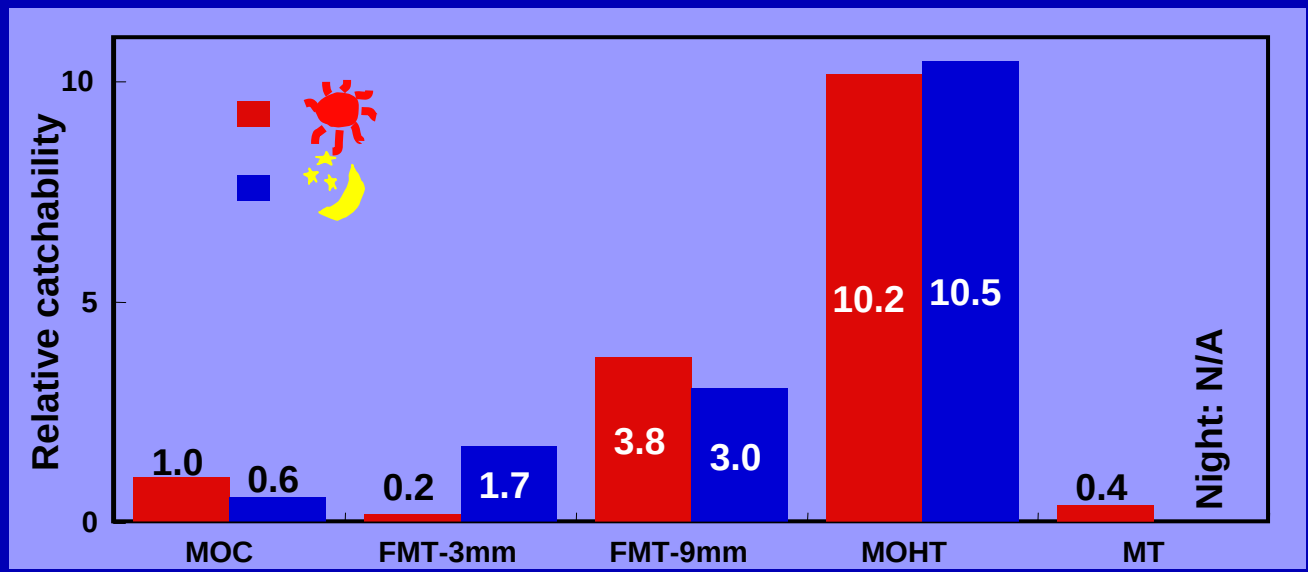
Catchability for large-sized fish (41-80 mm)

- based on N of fish caught at Stn. 2-4
- Relative measure with MOC (D) = 1.0
- MOC ≅ FMT(3mm) < FMT(9mm) < (MOHT)
- No D/N difference, except for 3mm FMT
- MT: low efficiency



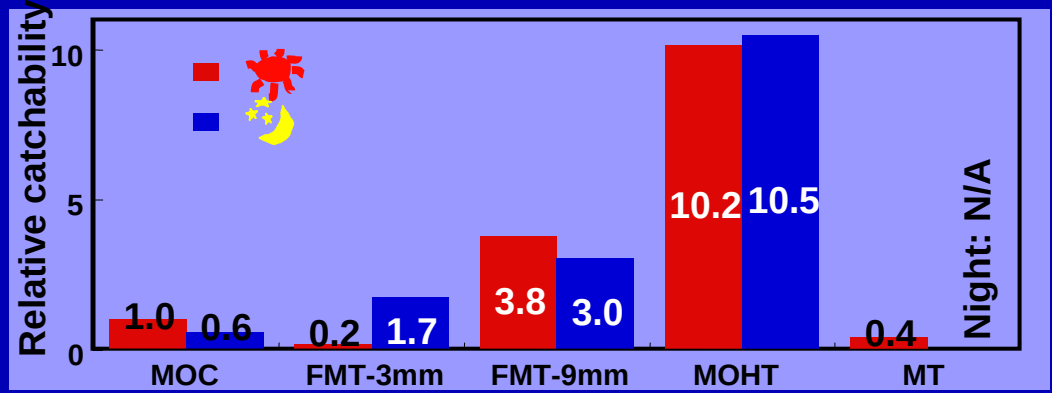
Catchability of large-sized fish (cont'd)

- No or slight D/N difference, except for 3mm FMT
  - suggesting limited visual avoidance
- MT
  - Low catchability due to large mesh size in the wing and belly, but caught largest quantity of micronekton
  - Poor condition of specimens due to turbulence in the codend
  - not recommended for sampling <80mm micronekton, but effective for sampling more evasive larger micronekton and nekton



Catchability of large-sized fish (cont'd)

- FMT - 3mm
  - Lowest efficiency during daytime
  - Perhaps due to visual avoidance, due lowest towing speed and the presence of bridle ahead
  - Inadequate for micronekton sampling
- FMT - 9mm
  - Limited catchability, but sample micronekton more effectively than MOC-10
- MOHT
  - Sample micronekton most effectively
  - Excellent sample condition (often alive!)
  - Highly recommended for micronekton sampling



Summary

- Catchability of 4 sampling gears were tested for micronekton sampling: MOC, FMT, MOHT and MT
- MOHT showed the highest efficiency for micronekton sampling
- MOHT is strongly recommended for the sampling of micronekton
- However, MOCNESS is still essential for discrete sampling

Further analysis

- Incorporating results from MIE-I (using data of FMT)
- Analyze and compare MOC-1 samples
  - Size selectivity and catchability of *Euphausia pacifica*
- Other gears to be tested:
  - $4m^2$ MOCNESS
  - IKMT (MIE-I)
- Size selectivity analysis (ongoing)
- Comparison with EK-60 backscattering data (ongoing)