

Employing a trawl independent multi-compartment towing rig to study selectivity of crustaceans in trawls



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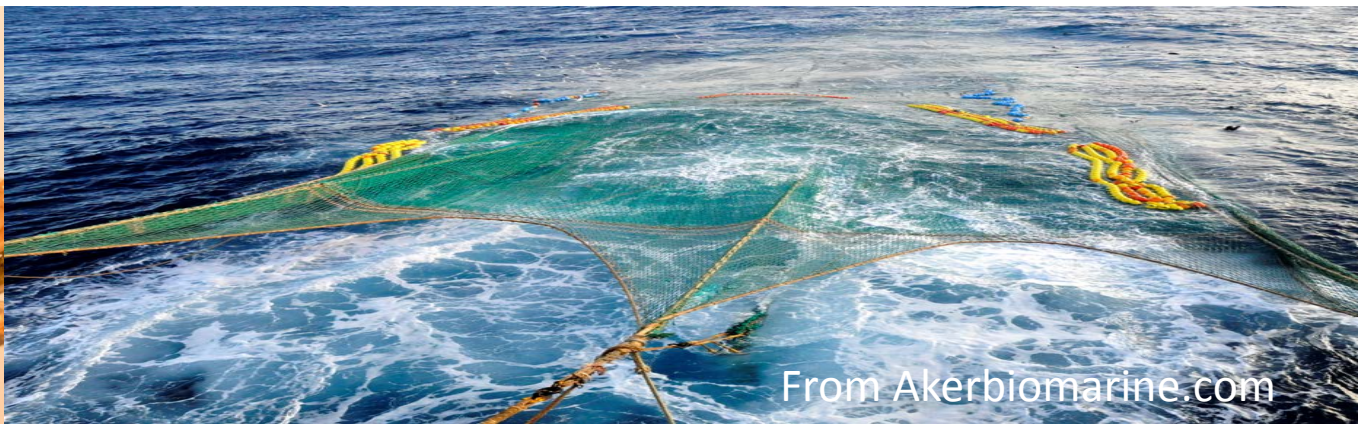
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Short background: The Antarctic trawl fishery for krill

- Large biomass (~200 mill tonnes)
- Increasing commercial interest for the fishery
- Large small-meshed and low tapered trawl constructions
- Large factory trawler towing 2.0-2.5 knots (volume fishery)
- Very limited scientific knowledge of the krill fishery in terms of selectivity and survival of escapees



2-7 cm in length



From Akerbiomarine.com

Sizes selectivity of krill

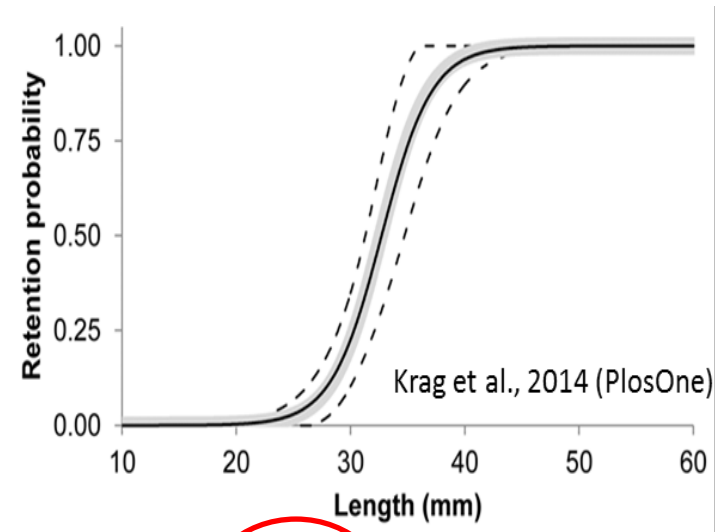
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Size Selection of Antarctic Krill (*Euphausia superba*) in Trawls

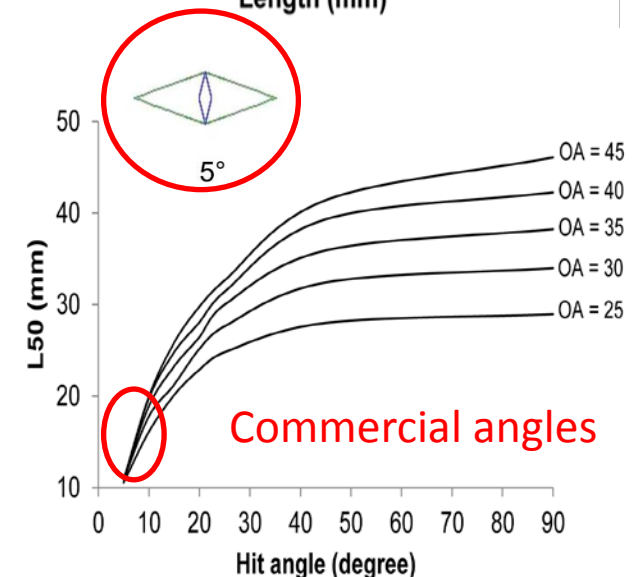
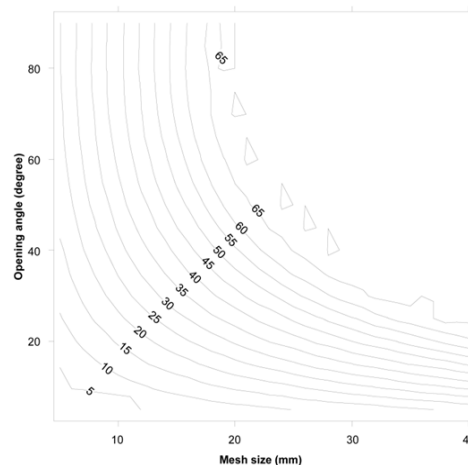
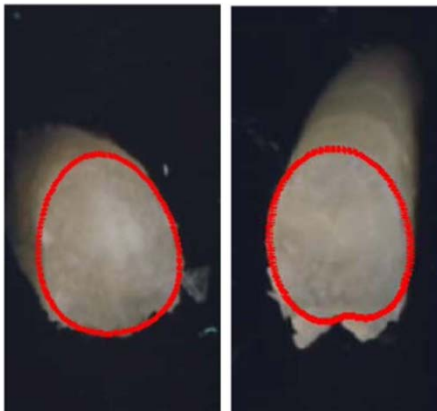
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- Substantial sizes selectivity (experimental and theoretic)
- Theoretical effect of different trawl designs (tapering, mesh sizes) – no experimental work conducted
- Theoretical large effect of tapering angle



CS1

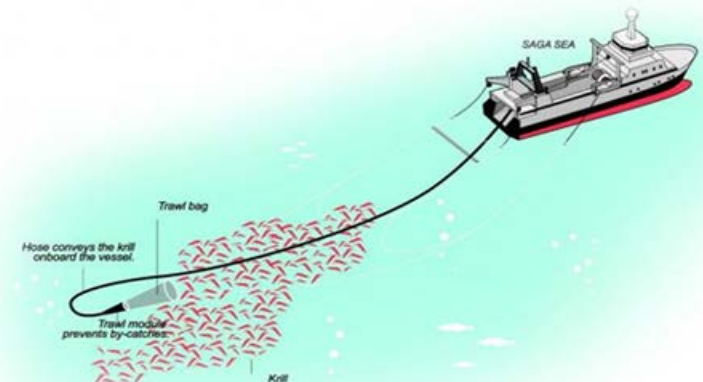
CS2



Studying sizes selectivity of krill in commercial trawls

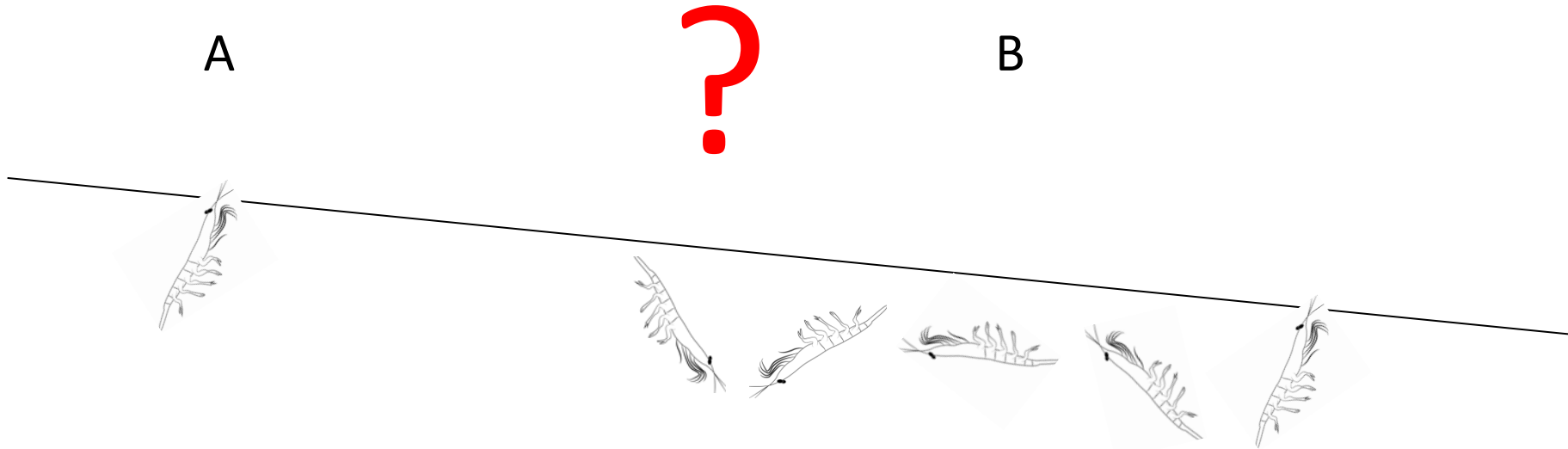


- We can study codend selectivity
- We however observe selectivity in the entire length of the trawl
- Low tapering – collecting bags difficult due to masking
- Pumping system – towing for weeks at the time (complicating shooting)



From Akerbiomarine.com

What selectivity process do we expect?



A: Active process involving behaviour and sufficient swimming abilities like most fishes?

B: Passive/random process, resembles a sieving process resulting in multiple netting contacts?

- A and B can in some gear designs lead to similar selectivity estimates
- How do we study the sizes selective process of krill in commercial netting?

Trawl dimensions:

L: 230m

H: 16m

IT IS A
CHARACTERISTIC OF
WISDOM NOT TO
DO DESPERATE
THINGS.



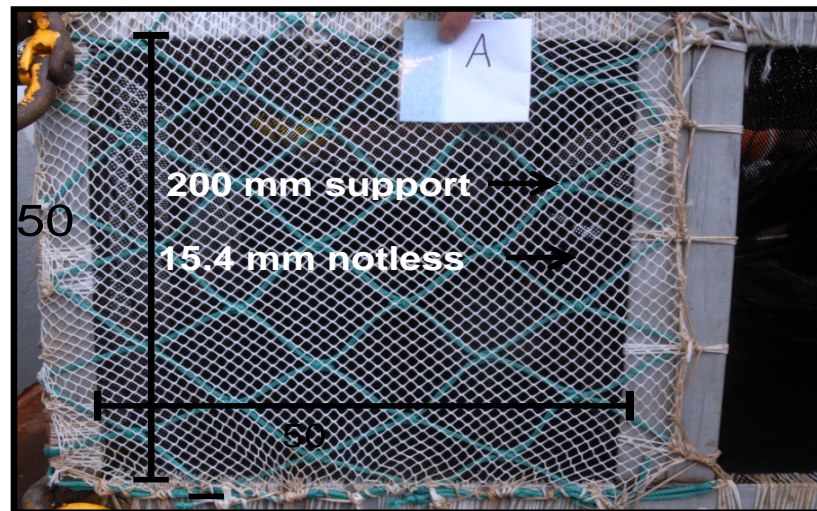
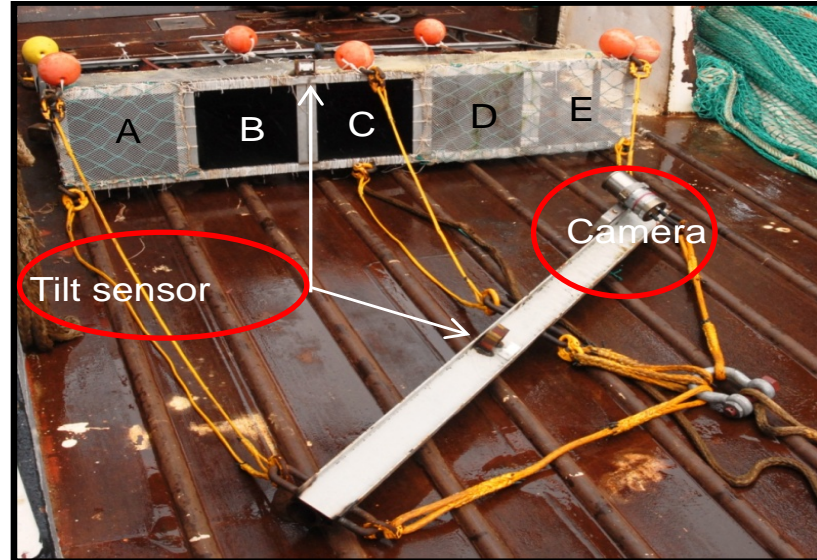
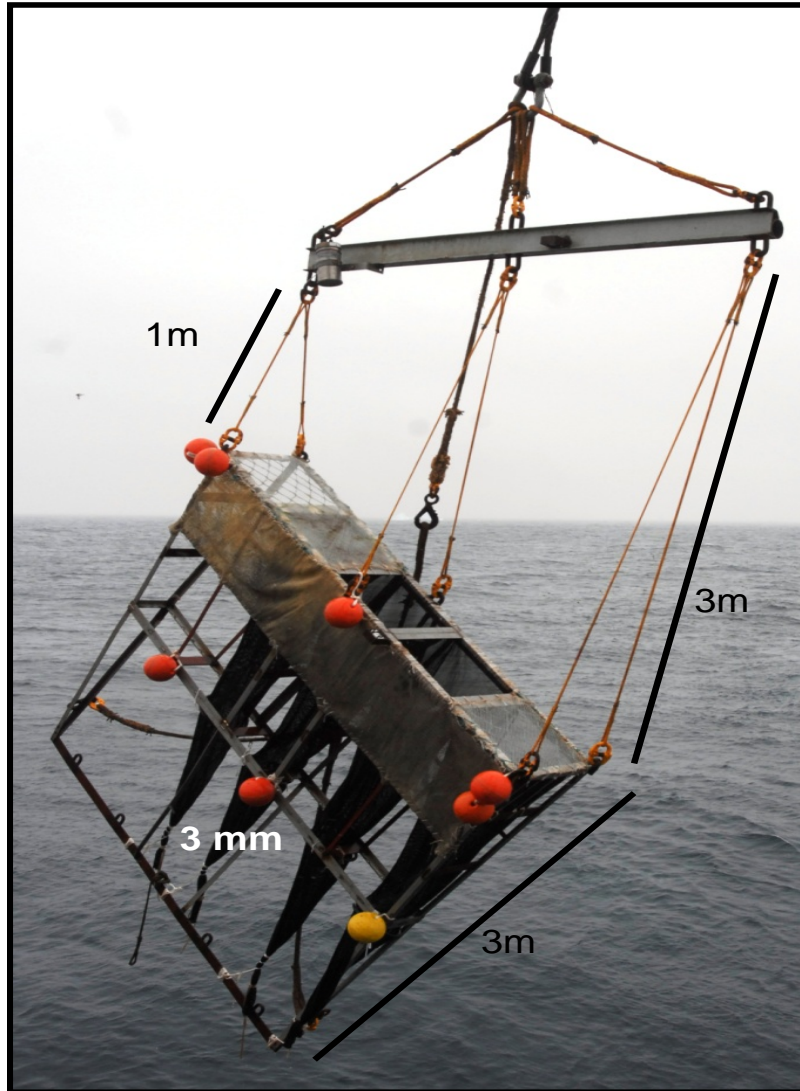
Henry David Thoreau
American Author
1817-1862

quoteHD.com

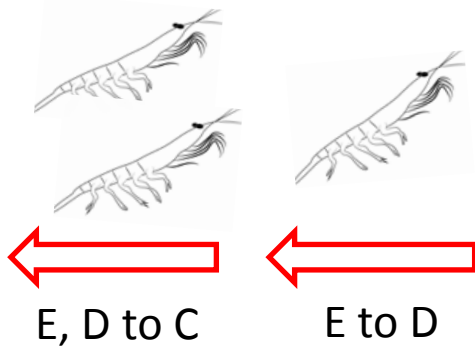
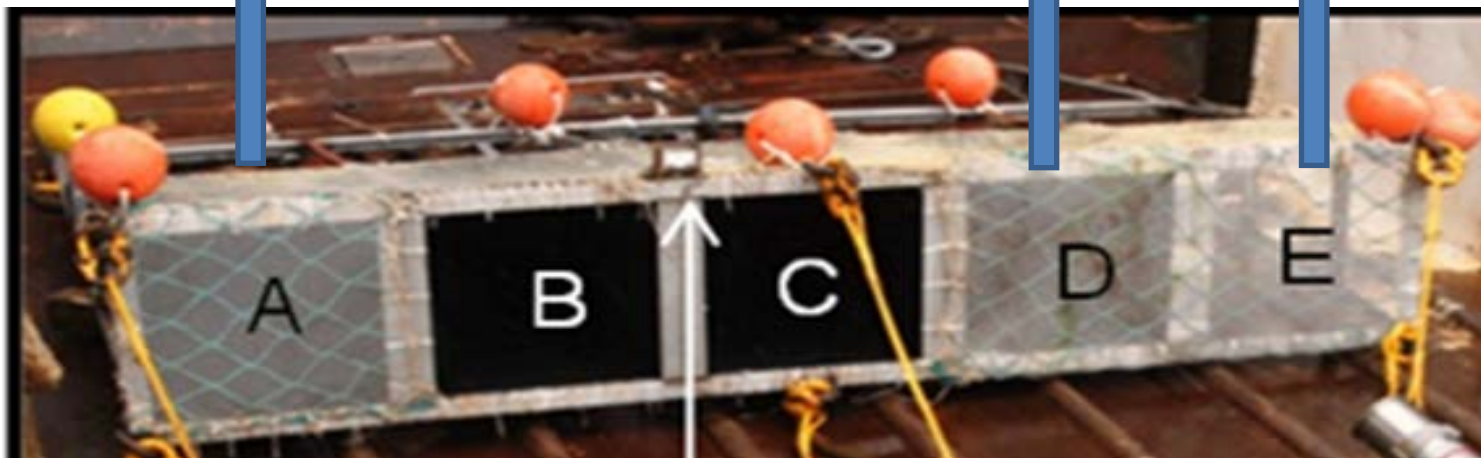
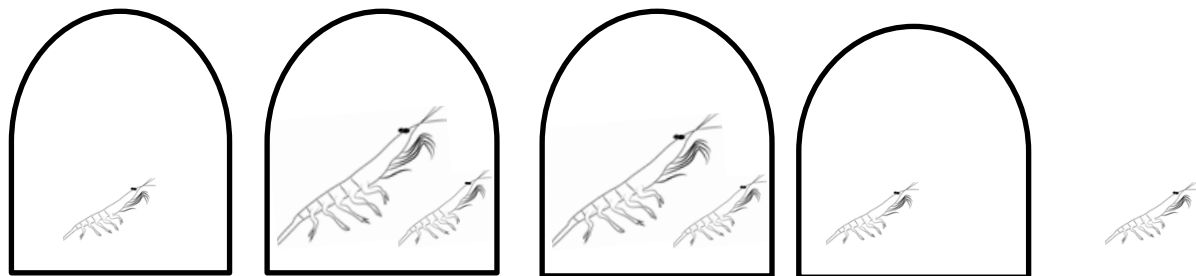
It could have stopped here....

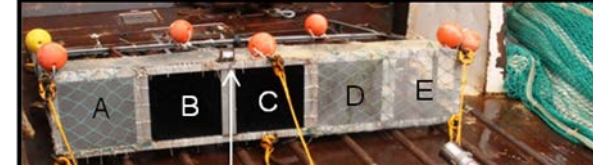
Out of the box –

Can we study selectivity in trawls without a trawl?



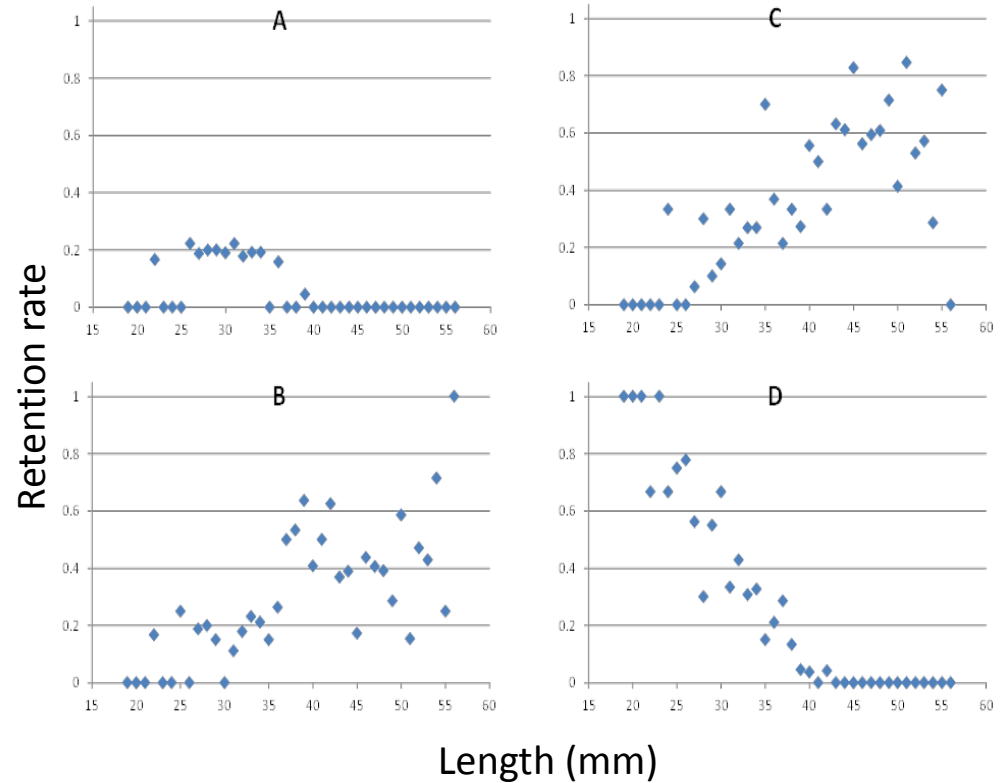
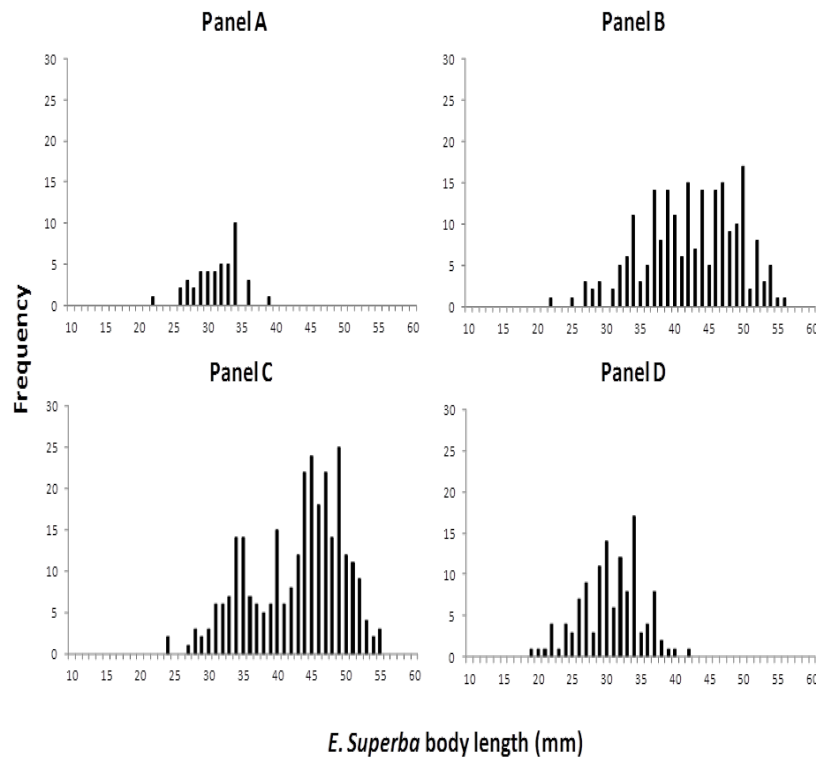
Design idea



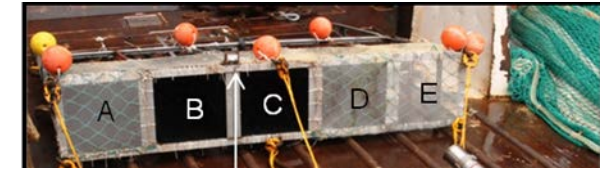


Catch pattern

- 10 hauls on commercial krill grounds of the coast of South Orkney Islands
- Relative low towing angle (tapering) compared to commercial practice



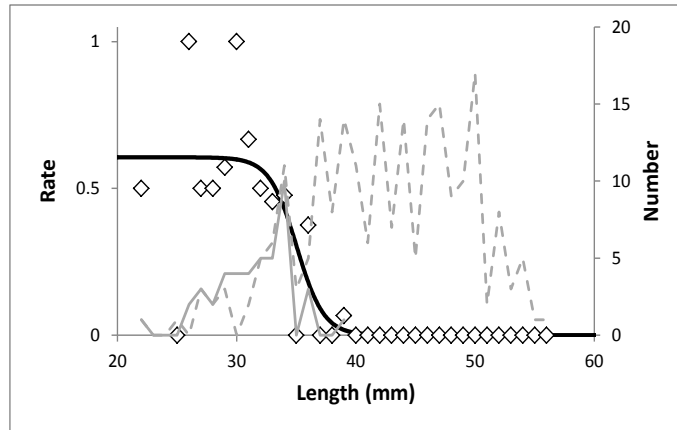
Data analysis



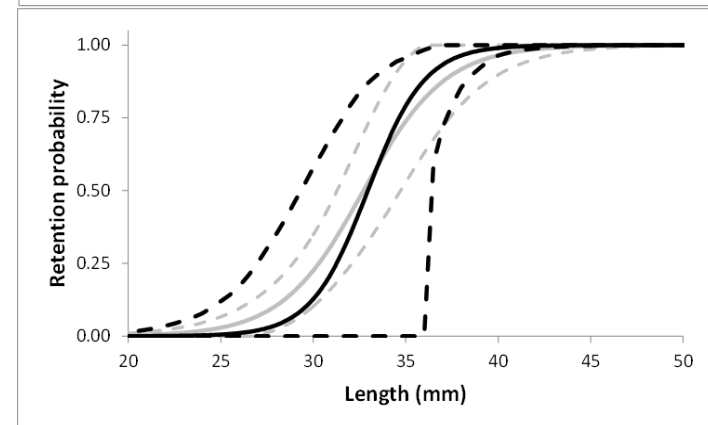
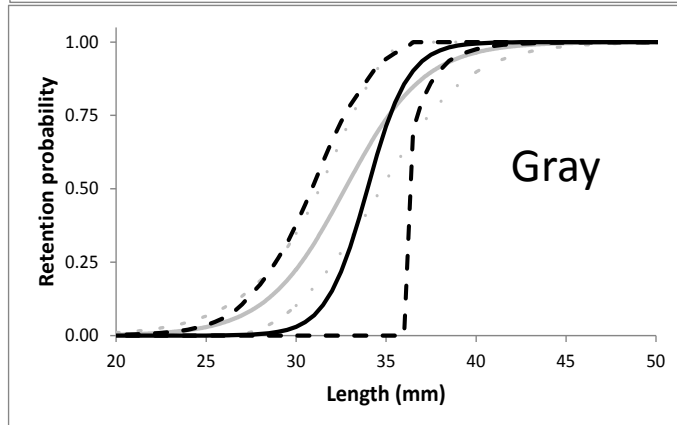
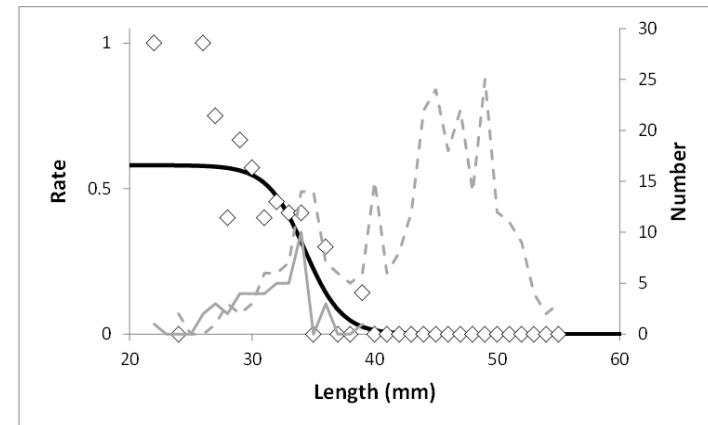
- Paired compartment comparisons

We can directly compare different combinations of compartments (A-D) in a paired design (escapes and not retained individuals are used)

A vs B

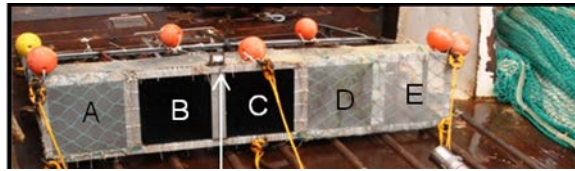


A vs C

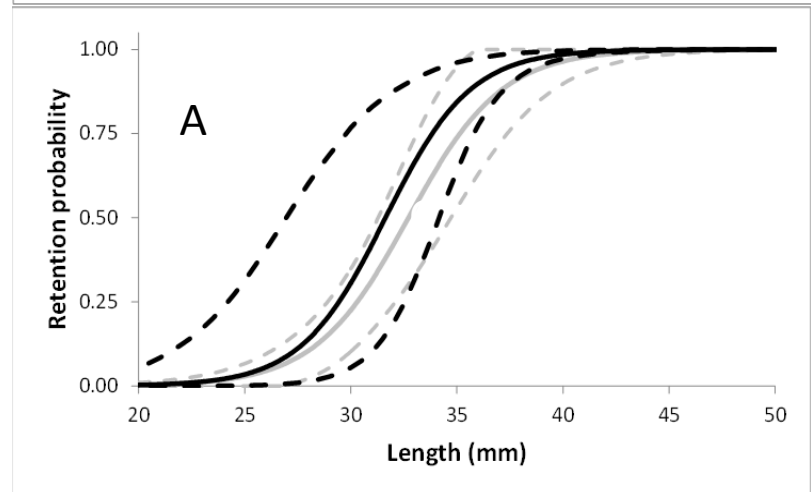
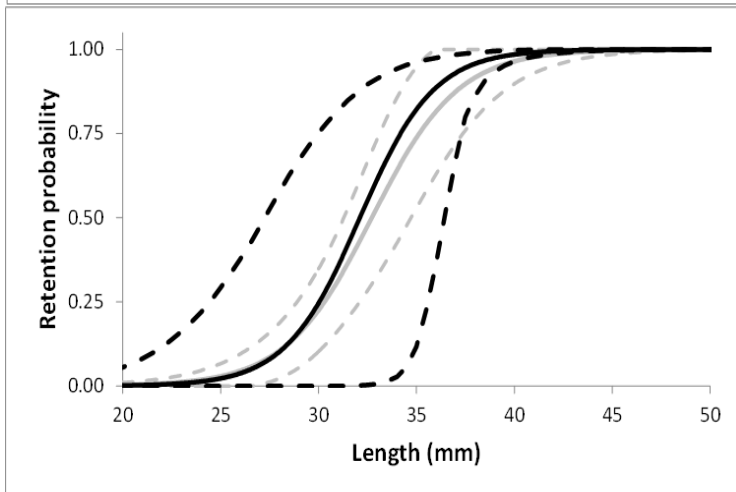
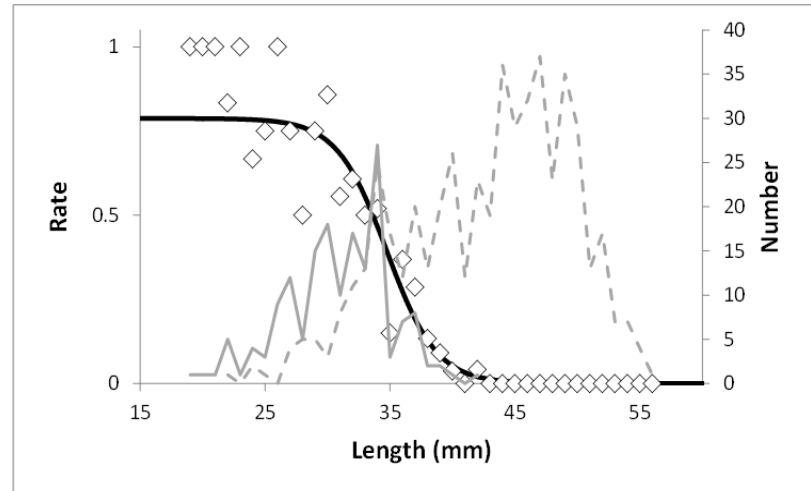
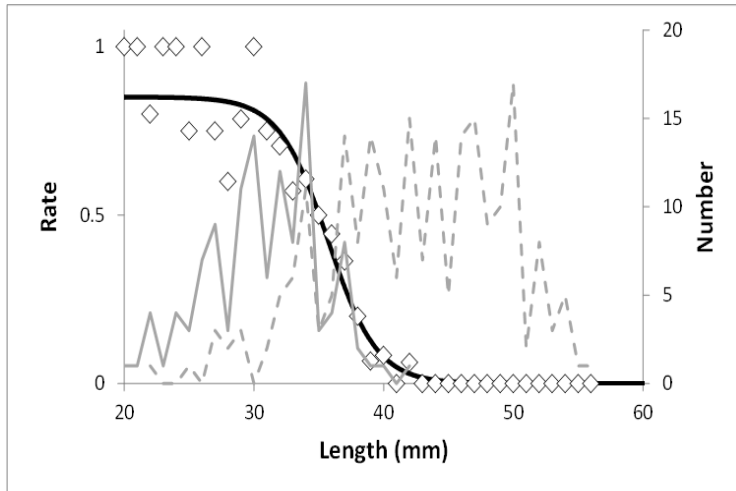


Results for D vs B and A+D vs B+C.

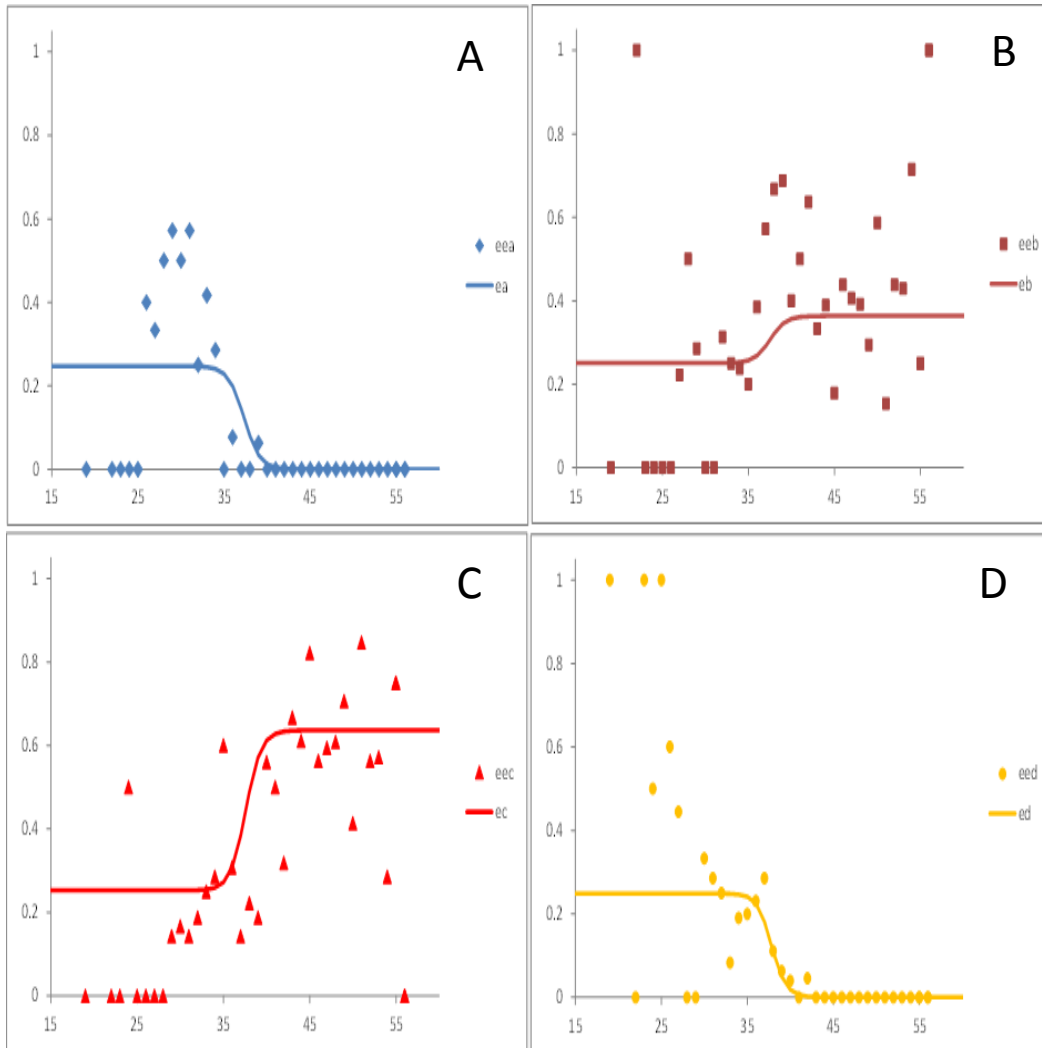
D vs B



A+D vs B+C.



Modelling of the full process (A-E)



We need to assumption that there were no transport of individuals from one compartment to the next!

Small backwards tilt – transport of individuals over the system – not along (E-A) (Rigging error)



Conclusion

- We demonstrated that realistic selectivity, describing the sizes selectivity in large commercial trawls can be obtained using a small trawl independent towing-rig
- BUT we did not obtain data to study detailed sizes selectivity along the trawls netting panels the system was designed to quantify
- This initial study indicate a potential for applying trawl independent towing devices to explore and estimating e.g. the selective process of small crustaceans in trawls



Thanks for listening



Thanks to:

Norwegian Research Council for funding
SILF (P. no 243619) and to

Aker Biomarine and Olympic Seafood for
supplying vessel time for the project

