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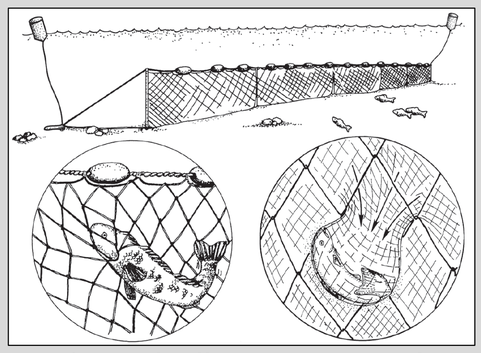
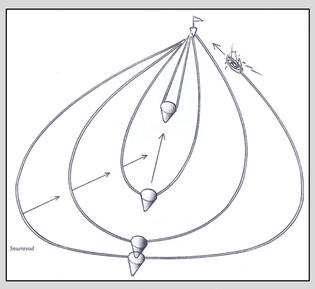
BACKGROUND

- The Common Fisheries Policy of the European Union has enacted a landing obligation, prohibiting the discard of quota regulated fish species.
- The regulation includes the possibility of exemption from landing obligation for "*species for which scientific evidence demonstrates high survival rates*".
- The majority of studies on discard survival have focus on trawl fisheries and data from smaller, more sustainable fisheries is therefore limited.



Traditional gill net *Trammel net*



Danish seine

OBJECTIVES

- Estimate discard survival in plaice and cod from vessels fishing with trammel net and Danish seine.
- Assess injuries and reflex impairments after capture and after observation of short-term survival rate.
- Determine the effects of catch-related injuries and reflex impairments on discard survival.
- Determine the effects of housing conditions during observation on injuries and reflex impairments.

METHODS

- Captured fish were: 1) Assessed for injuries and reflex impairments, 2) Transported to shore in tanks with oxygenated sea water, 3) Transferred to housing facilities, 4) Observed for short-term mortality for 4-11 days, 5) Assessed for injuries and reflex impairments.
- Reflex Action Mortality Predictor (RAMP) and Catch-Damage-Index (CDI) scores provide information about the overall level of reflex impairments and injuries, respectively.
- For each fish, RAMP scores from 0-3, and CDI scores from 0-9 were calculated by adding scores for the 3 reflexes and 9 injuries, respectively (Figure 1).

	Trammel net	**Danish seine**	**Trammel net**
Species:	Plaice (n = 118)	Plaice (n = 98)	Cod (n = 46)
Total fish length (cm):	33 ± 1 (22 – 40)	24 ± 1 (14 – 32)	37 ± 1 (29 – 41)
Reflex impairments:	Absent from >90% of the fish	Absent from 80% of the fish	Absent from >90% of the fish
Principal injuries:	Bruises, fin fraying, net marks	Bruises, fin fraying, net marks	Bruises, fin fraying, net marks
Survival:	**100% (0 dead fish)**	**87% (13 dead fish)**	**89% (5 dead fish)**

Reflex	**Stimulus and responses**
Righting	Righting itself when turned upside down under water.
Evasion	Swims toward the bottom when released at the surface.
Tail grab	Struggle or tries to escape when tail is held between two fingers.

Injury	**Description**
Bruises (minor / medium / major)	Areas with discoloration or scale loss (0-10% / 10-50% / 50-100%).
Fin fraying	Shredding of the thin skin between the fins.
Blood clots	Blood clots visible through the skin.
Minor wounds (head / body)	Shallow cuts or punctured skin.
Deep wounds (head / body)	Deep cuts or punctured skin, often with Bleeding.
Intestines	Intestines visible through the anus.
Net-mark	String cuts from net contact.

Table 1 *For reflexes, individuals was scored 0 if the response was completed, or 1 if the response was not completed (i.e., impaired). For injuries, individuals was scored 0 if the injury was absent, or 1 if the injury was present (results in Figure 1).*

RESULTS & CONCLUSION

- Survival rate was high for both species and fisheries.
- Reflex impairments were virtually absent which may have contributed to the high survival rate.
- Bruises, fin fraying and net marks were frequent but did not appear to reduce survival rate.
- Results have already contributed to an exception from the EU landing obligation for fish from trammel net and Danish seine.

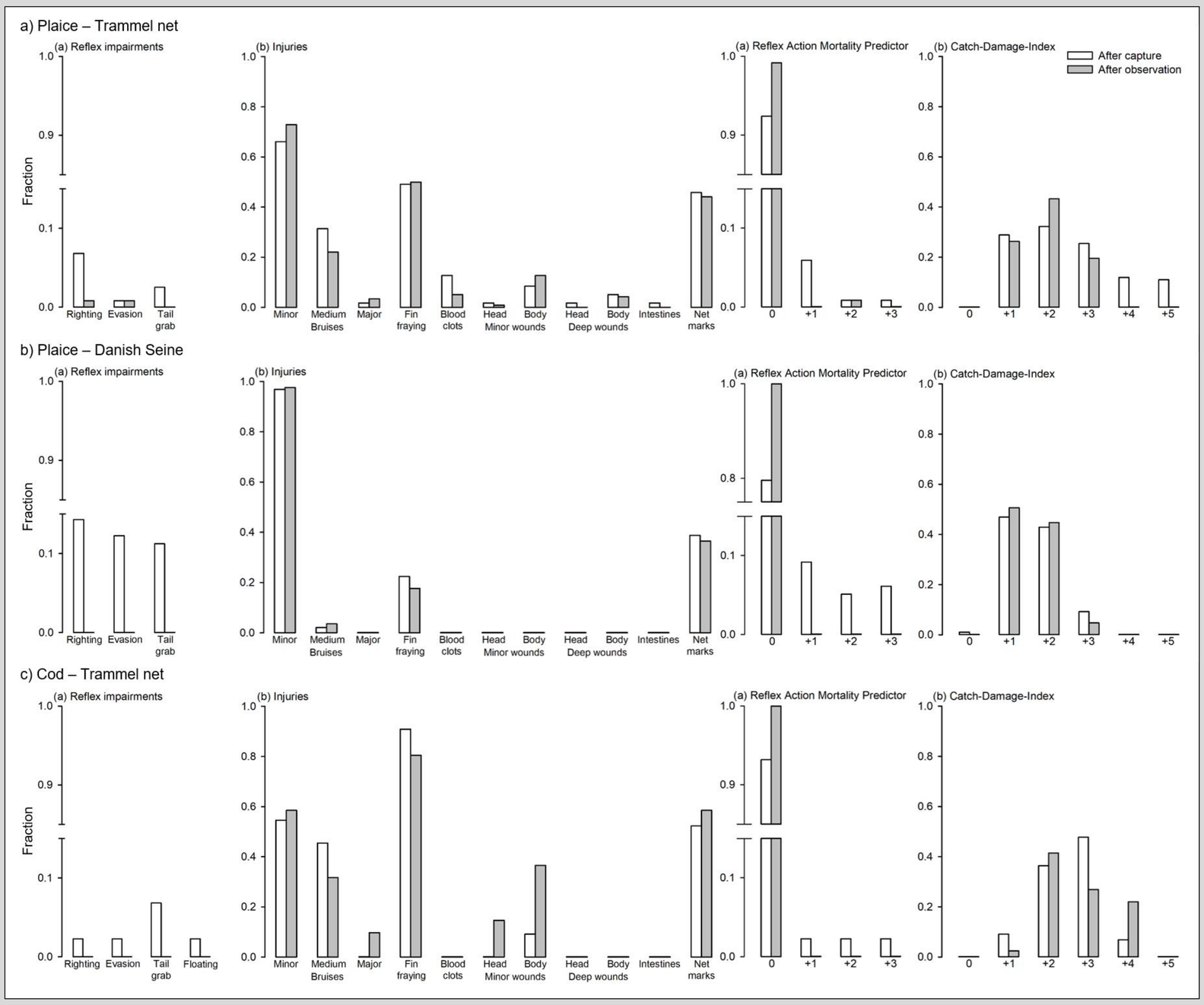


Figure 1 *Fraction of fish with reflex impairments and injuries, as well as RAMP and CDI scores, after capture (white), and at the end of the observation period (grey).*

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