
Atlantic cod and whiting differ in occurrence of electrical-pulse induced injuries

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Conventional beam trawling for common sole (*Solea solea*) uses tickler chains to chase the flatfish from the sediment. The alternative is pulse trawling, where electrical pulses are used as stimulus. Electrical pulse trawling exposes both target fish and non-target fishes to high electric field strengths between electrodes that are dragged over the sea floor. The pulsed electric field elicits muscle cramps that may lead to spinal injuries and haemorrhages. So far, injuries have primarily been found in the non-target gadoid species Atlantic cod (*Gadus morhua*) and whiting (*Merlangius merlangus*). Hence, Gadidae are thought to be sensitive to muscle-cramp induced injuries. Multiple laboratory and field experiments confirm susceptibility to electrical-pulse induced injuries in Atlantic cod. For whiting, however, few data from field studies are available, and laboratory experiments are lacking because whiting does not adapt well to captive conditions. To assess whether findings for Atlantic cod also extend to whiting, we present occurrences of injuries in an extensive random sampling of aforementioned gadoid species on board commercial vessels. Because injuries could also be inflicted mechanically by e.g. gear components, debris in the netting, and handling on deck, we compare injuries for pulse gear with electrical pulses turned on and off, and the tickler-chain gear. To visualise spinal injuries, fish were X-rayed, followed by dissection to reveal internal haemorrhages. Both spinal injury and haemorrhage position were quantified on the anteroposterior axis of the animals. By analysing specimens from these different catch methods, we pinpointed whether potential internal injuries could be attributed to the electrical stimulus and to what extent internal injuries are caused using the conventional fishing method. In contrast to whiting, Atlantic cod showed the highest injury occurrence in pulse-on catches.