

DOCTORAL CANDIDATE: Tonje Knutsen Sjørdalen
DEGREE: Philosophiae Doctor
FACULTY: Faculty of Mathematics and Natural Sciences
DEPARTMENT: Biosciences
AREA OF EXPERTISE: Marine ecology
SUPERVISORS: Esben Moland Olsen (HI), Halvor Knutsen (HI)
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DISSERTATION TITLE: *Marine reserves and selective fishing shape mating behaviour, secondary sexual trait and growth in European lobster*

Despite the widely acknowledged importance of sexual selection and mating behaviour in shaping population dynamics and evolutionary trajectories, we know surprisingly little about how human exploitation may interfere with mating patterns, particularly in marine species.

In her doctoral thesis, Tonje K. Sjørdalen finds that selective harvesting can deteriorate sexual selection and promote slower body growth in European lobster (*Homarus gammarus*). She used genetic paternity assignments to compare lobsters mating patterns in and outside a marine protected area (MPA), and demonstrate that females prefer larger males, but this pattern was less pronounced in the heavily fished area, suggesting females have more difficulties finding attractive males in fished areas. Interestingly, sexual selection was found to be strongest on the size of claw relative to the body size of males.

Harvest selection acts in opposition to sexual selection since the trap fishery have been shown to target the males large relative claw size. However, Sjørdalen also demonstrate that small-scale MPAs can be highly effective in preserving traits under sexual selection and to counteract these undesirable effects. By analysing capture-recapture data and morphological measurements obtained from three lobster reserves on the Norwegian Skagerrak coastline and adjacent area open to fishing, she finds that lobster inside MPAs have larger relative claw size, but also that they grow faster. The latter is most likely caused by the fishery targeting fast-growing and hungry individuals. Consequently, her results indicate that fishing drive evolution towards a slow-growing, smaller and less productive lobster, and that MPAs appears to be an essential solution to reduce such change.

The importance of her work extends beyond local scale and study species as it is reasonable to assume that negative effects of selective harvesting is widespread in most, if not all, heavily exploited populations. Understanding what traits are subjected to sexual selection, and how species responds to anthropogenic pressures, is vital if we are to manage wild populations sustainably. She recognizes that implementation of more no-take marine protected areas have a multitude of benefits of interest to management, and when used in combination with harvest regulations that ensures protection of the largest and fittest individuals, -could prove to be a promising way forward.

