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Novel ideas in management of cleaner wrasse fisheries

Every year, more than 20 million wrasses are captured and used as cleaner fish in Norwegian salmon farms to reduce sea-lice infestations. In his Ph.D. thesis, Halvorsen demonstrates that the corkwing wrasse fishery is size- and sex-selective; targeting large males that build nests and care for the offspring. However, the fisheries can be less sex-biased with a simple management tweak; implementing a maximum size limit in addition to traditional minimum size limit. In western Norway, the nesting males were found to grow much faster and mature later than females and mature males are therefore not protected by the current minimum size limit. The balance can be restored by protecting the largest fish, because the faster growing males will reach the maximum size limit at a younger age than the females. However, a maximum size limit seems not to be appropriate in populations in Southern Norway. Here, the sexual growth differences were less pronounced. Halvorsen suggests that the stronger sexual differences on the western coast is related to higher population density, implying that males have to compete harder to obtain a nesting territory. This should select for males who grow fast and delay maturation to increase their odds to reproduce. In a different study, Halvorsen found that the nesting males, independently of body size, are more likely to be trapped in the fishery than females, indicating that the territorial behaviour or higher growth rates increase their attraction to baited traps. Thus, it is concluded that sexual variation in life history traits and behaviour must be assessed and accounted for to a larger extent than what is currently common in many commercial species. This is likely to reduce sex-selective harvesting and may therefore have positive effects on reproduction and recruitment and could buffer against fisheries-induced evolutionary change.

Lastly, Halvorsen used protected and fished areas as field laboratories for assessing the impacts of fishing and other factors on the wrasse populations. The abundance of wrasse was higher in the protected areas, while variation on life history traits tended to vary more geographically than with the level of protection. Interestingly, growth rates of goldsinny wrasse were found to be negatively correlated with abundance of cod, a top predator in the coastal ecosystem in Norway. This demonstrates the close link between wrasse and other ecosystem components and why it is important to avoid overexploiting them.