

Title: **The cost of fisheries induced evolution. An example using data for North-East Atlantic cod**

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Abstract: Age and size at maturity are key life-history traits in a fish stock. At the individual level age and size at maturity affect fecundity, growth and survival. At the population level these factors interact to affect age and size distribution, the population dynamics and the productivity of the stock. A maturation reaction norm is a function describing the probability that a certain percentage of the stock has reached maturity at a given age. Recent studies have shown that high levels of fishing mortality may act as a selective force, favoring individuals that mature at an early age and size, causing a negative shift in the reaction norm denoted fishing induced evolution. Reducing the age and size at maturation generates a number of negative effects that may be slow to reverse or even irreversible: In general, somatic growth is dramatically decreased after maturation, implying that as age and size at maturity are driven to lower levels, the stock will consist of smaller individuals. Further, smaller fish have lower fecundity than larger fish, implying a reduction in the number of fish being recruited. Together, these effects may reduce the yield of the stock, increase risk of extinction and have a number of adverse effects on the ecosystem. This paper assess the cost associated with a reduction in maturity at age for cod North-East Atlantic.