Having Confidence in Productivity Susceptibility Analyses: A method for Underpinning Scientific Advice on Skate Stocks?

Abstract:
National and European shark conservation plans aim to manage elasmobranch stocks sustainably. However uncertainties and deficiencies with available data hamper traditional, quantitative assessment methods of stock status to inform those plans, and thus effective management. The International Council for the Exploration of the Sea (ICES) Expert Groups have explored a range of data deficient assessment methods that may be used to support management advice, including Productivity Susceptibility Analysis (PSA). This method was applied to the demersal elasmobranch fauna (21 species) of the Celtic Sea to explore how such approaches could inform the management of skates (Rajidae). This species complex is an important catch component for demersal trawl and gillnet fisheries and is currently managed under a mixed species total allowable catch (TAC). PSAs were conducted on both of these fisheries, by four experts from three countries to introduce independence, and to quantify the range in perceptions of each stock. Confidence scoring of attributes was incorporated and probability distributions generated to model uncertainty in the expert responses to susceptibility attributes. Results showed that three shark species (tope, Galeorhinus galeus; angel shark, Squatina squatina and spurdog, Squalus acanthias) were the most vulnerable species in both fisheries (a consequence of their life history strategy and large size), followed by two skates (otter trawl) and three skates (gillnet). All of these species have some form of restrictive management and, apart from tope, are either currently listed as prohibited species or have a zero TAC in the area. Blonde ray, Raja brachyura was ranked as the next most vulnerable member of the commercially exploited skate complex. This adaptation of the PSA approach enabled skate species of higher and lower risk to be ranked and thus inform where management efforts should be focussed, whilst giving a novel consideration to uncertainty through canvassing expert opinion.

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