EXPLORING THE NECESSARY DATA REQUIREMENTS TO USE META-ANALYSIS IN ECOLOGY

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Currently there is little focus on the use and application of quantitative reviews and meta-analysis in ecology. This study seeks to highlight the advantages and use of these powerful statistical techniques that allow conclusions to be drawn from the outcomes of multiple studies without collecting new data. The factors used in this study are early life history traits of various cold ocean marine fish such as those from the family Gadidae, Gadus morhua (Atlantic cod), and Pleuronectidae (flatfish) such as dab, plaice, and flounder that occupy different areas of the water column. Possible links to the combined effects (e.g. temperature, salinity, pollution) of global warming especially in recent decades may be seen in trends in variability within early life history traits of these fish families. Initially a data base of experimental and observational studies spanning across several decades that contained early life history data from online sources was compiled using a Firefox® plug-in, Zotero®. Then, using data extraction applications such as Engauge®, raw data and other important statistical information was extracted from tables and figures of the studies and organized into a Microsoft Excel® spread sheet file. Initial quantitative analysis consisted of data visualization using SPSS® and showed high variability among species and fish families. Finally, small meta-analyses were performed to test its use as a analytical technique. Preliminary analysis shows that 1) Quantitative analysis need to be done at the species level due to high variability among studies, but meta-analysis may overcome this issue, 2) Confounding factors introduce problems, 3) Many similar studies must be present in order to extract enough data for meta-analysis, 4) All aspects of a study are important suggesting some standardization of environment reporting is necessary (e.g. stating temperature of egg collection). Therefore, the goal of the study was met demonstrating the possible use of meta-analysis and a need for further focus of this technique in ecology.

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