Model selection for integrated population models
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In ecology it is often the case that aspects of the demography of wild animals are studied using different data collection methods, resulting in multiple data sets. Typically, component models share some common demographic probabilities and rates. Integrated population modelling occurs when likelihoods arising from independent data sets are multiplied together to form a single, joint likelihood; see Besbeas et al (2002). The approach is now widely used, but there has been no formal assessment of how model selection should be addressed.

This project compares alternative methods for model selection in integrated population modelling using classical inference, considering component likelihoods separately and in combination. We focus on the important case of determining the age-structure for annual survival probabilities when two component data sets are involved. We compare the use of procedures based on likelihood-ratio tests as well as AIC and our findings suggest that it is generally better to do model selection using likelihood-ratio tests and the joint likelihood, rather than use a component likelihood.