

New methods of model-selection and assessment for complex capture-recapture models

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Abstract: We perform a general review and comparison of different models used for capture-recapture data. The Cormack-Jolly-Seber model makes very strong assumptions, which often do not reflect real-life conditions. Many complex models have since been developed to take into account aspects such as individual heterogeneity for capture and survival probabilities or the different states in which animals can exist. Multievent models, based on hidden Markov models (MacDonald and Zucchini, 1997), allow for uncertainty in the assignment of these states. We consider technical aspects of mixture models (Pledger et al, 2003) and more general multievent models (Pradel, 2005). We explore the use of goodness-of-fit tests and score tests through application to data on Great Cormorants *Phalacrocorax carbo*, extending the work of Cole et al, (2014).

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