Making R available to a wider audience: an example in power analysis software for capture-recapture studies

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Abstract: A question that many of us face is how to get our statistical developments to reach a wide audience. Although many ecologists are now using R, this tends to be on an occasional basis such that commands and syntax need to be re-learnt each time, representing a barrier to uptake even when statistical code is highly customised and easily available. Some new R tools, such as the Shiny package (RStudio and Inc. 2013), make it easy to create simple, interactive user interfaces to complex code. The interface opens in the user's web browser, and can also be run remotely. A simple user interface takes minimal effort to create and finalise, but things do get more complicated if subsequent options for display must depend upon previous choices made. I will demonstrate a user interface for new software 'CaPow' that we have developed for power analysis in capture-recapture studies, based on the 'POPAN' model (Arnason and Schwarz 1996). The primary focus is to determine whether the study design is likely to have the power to detect a specified rate of annual increase or decrease in population size. A typical question might be whether, given funding for six annual surveys, it is better to space them biennially (2014, 2016, ..., 2024), or in two blocks of three (2014-2016, 2022-2024). The software allows users to simulate from any model they like, and fit any other model they wish, so that the impact of model misspecification can also be investigated. The interface design may be useful for many other applications in statistical ecology.

References

Arnason, A. and Schwarz, C. (1996) A general methodology for the analysis of capture-recapture experiments in open populations. *Biometrics,* 52:860-873.

RStudio and Inc. (2013) *shiny: Web Application Framework for R.* R package version 0.4.0. `http://CRAN.R-project.org/package=shiny`