Comments

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The use of sighting records to infer species extinctions: comment

Ivan Jarić[1]

In their recently published paper, Rivadeneira et al. (2009) estimated performance of a number of methods that infer probability of extinction of a species based on sighting records. However, while the authors present a scientifically sound and valid study, there is an error in several equations presented in the paper, namely in those presented in Table 1. The first three equations in the Table 1 (i.e., "S&S", "SOL," and "MCY"; Rivadeneira et al. 2009) mistakenly do not produce upper 95% bound of the confidence interval (CI) for extinction time.

The authors assessed the methods that were originally formulated to express the probability of a presence of a species, so the authors reorganized them and solved for the time at which probability equaled 0.05 in order to conduct simulations for comparing the methods. However, the first three equations presented in Rivadeneira et al. (2009, Table 1) were mistakenly formulated to show the upper 5% CI.

The correct equation that indicates the upper bound of the confidence interval, based on the equation established by Solow (1993), should be

$$T_{\mathrm{CI}} = \frac{t_n}{\alpha^{(1/n)}}$$

where T_{CI} is the upper bound of the confidence interval of the extinction time, t_n is the time of the latest sighting, α is the confidence level (0.05), and n is the total number of sightings. The correct equation can be observed as well in Solow (2005; Equation 5).

The correct equation for the upper bound of the confidence interval of the extinction time for the method established by McInerny et al. (2006) is

$$T_{\mathrm{CI}} = t_n + \log_{[1-(n/t_n)]}\alpha.$$

The correct equation for the upper bound of the confidence interval for the method established by Strauss and Sadler (1989) is as follows:

$$T_{\mathrm{CI}} = t_n + \lambda R$$

$$\lambda = \alpha^{-1/(n-1)} - 1$$

where R is the total temporal span of sightings.

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[1] Institute for Multidisciplinary Research, University of Belgrade, Kneza Viseslava 1, 11000 Belgrade, Serbia.
E-mail: ijaric@imsi.rs

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The use of sighting records to infer species extinctions: reply

Marcelo M. Rivadeneira,[1,4] Gene Hunt,[2] and Kaustuv Roy[3]

In his Comment, Jarić (2014) correctly points out the three equations for class 1 methods presented in Table 1 of Rivadeneira et al. (2009) that were incorrectly stated. We thank him for the correction. However, the typographical errors in that table do not affect any of the conclusions of the paper. We confirm that all the simulations reported in Rivadeneira et al. (2009) used the correct formulas (the incorrect formulas would have yielded a very low coverage in all scenarios). Hence, as Jarić (2014) states, the conclusions of Rivadeneira et al.

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[1] Centro de Estudios Avanzados en Zonas Áridas (CEAZA) and Universidad Católica del Norte, Av. Ossandon 877, 1781681 Coquimbo, Chile.

[2] Department of Paleobiology, National Museum of Natural History, Smithsonian Institution, P.O. Box 37012, NHB MRC 121, Washington, D.C., 20013-7012 USA.

[3] Section of Ecology, Behavior and Evolution, Division of Biological Sciences, University of California–San Diego, La Jolla, California 92093-0116 USA.

[4] E-mail: marcelo.rivadeneira@ceaza.cl

(2009) remain unaffected despite the typographical errors in Table 1.

We would also like to take this opportunity to make an additional clarification about the formulas for the methods SOL (Solow 1993) and MCY (McInerny et al. 2006). The notation of Table 1 assumes that the starting time for the first sighting is 0, as in our simulations. Hence, when using calendar dates (i.e., Gregorian), the most likely case in ecological applications, the timing of observed extinction or last sighting (T_n) should be accommodated in order to obtain the correct upper 95% confidence interval of the extinction time. For the SOL method, the correct equation should be

$$T_{\text{ci(SOL)}} = T_0 + \frac{R}{\alpha^{(1/H)}}$$

where T_{ci} is the upper 95% confidence interval of the extinction, T_0 is the time of the first sighting, R is the temporal span of the sightings, α is the confidence level (i.e., 0.05), and H is the number of sightings.

For the MCY method, the equation should be

$$T_{\text{ci(MCY)}} = T_n + log_{(1-(H/R))}\alpha.$$

The original VBA macro provided as a supplement to Rivadeneira et al. (2009) did use the incorrect formulas for SOL and MCY; the revised supplement provides the correct implementations and can be found with the original (Rivadeneira et al. 2009: Supplement, Revision 1).

Literature cited

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