Risky business or simple solution – Relative abundance indices from camera-trapping

Abstract

Camera-traps are a widely applied to monitor wildlife populations. For individually marked species, cap- ture–recapture models provide robust population estimates, but for unmarked species, inference is often based on relative abundance indices (RAI, number of records per trap effort), although these do not account for imperfect and variable detection. We use a simulation study and empirical camera-trapping data to illustrate how ecological and sampling-related factors can bias RAIs. Our simulations showed that (1) differences in detection between species led to bias in RAI ratios toward the more detectable species, especially at low detection levels, (2) species with larger home ranges were photographed more often, inflating RAIs, (3) species specific responses to different types of trap setup biased RAI ratios, and (4) changes in detection over time blurred true population trends inferred from RAIs. Empirical data for leop- ard cats Prionailurus bengalensis and common palm civets Paradoxurus hermaphroditus showed that traps set up along roads led to higher RAIs than off-road traps, but targeting roads increased detection more for leopard cats than for common palm civets. Comparing RAIs of Sunda clouded leopards Neofelis diardi and leopard cats with spatial capture–recapture based density estimates across sites, RAIs did not reflect dif- ferences in density. Analytical options for estimating density from camera-trapping data of unmarked populations are limited. Consequently, we fear that RAIs will continue to be applied. This is alarming, since these measures often form the basis for conservation and management decisions. We suggest con- sidering alternative analytical and survey methods, especially when dealing with threatened species. al value for tropical biota and could have a role in conservation.