Animal Conservation ZSL LIVING CONSERVATION

Associate Editor's choice

By Vincenzo Penteriani, Estación Biológica de Doñana, C.S.I.C.

Population monitoring of snow leopards using non-invasive collection of scat samples: a pilot study

J. E. Janečka, R. Jackson, Z. Yuquang, L. Diqiang, B. Munkhtsog, V. Buckley-Beason & W. J. Murphy
Animal Conservation 11 (2008), 401–411

One of the greatest challenges in science is the search for general rules that can help us to explain the amazing diversity that we observe in nature. This pursuit is rendered difficult by the complex variety of life histories of animal species. For this reason, the choice of good biological models is crucial. Very often, a good model is considered one that is easy to observe and experimentally manipulate, and that permits rapid publication of results (following the absurd but generalised 'publish or perish' way of thinking). The risk of selecting a biological model in such a way is that it always limits our investigations to the same species or group of species. We cannot hope to deeply understand and explain natural diversity using a narrow range of biological models. It is time to explore more frequently those species and systems that are unusual and less well studied. They may be more difficult to study, but they offer new and unexpected insights into methodological questions, ecological process and conservation practices. This will give us the possibility to present original and novel results, even when approaching biological themes that researchers have focused their attention on for dozens of years.

The Janečka *et al*. paper has, in my opinion, several merits. First, the authors have been faced with the challenge to focus their scientific interest on one of the most endangered and unknown mammals of the world, the snow leopard. This does not allow 'fast science', because the study species is like a 'mountain ghost' living in remote areas, extreme habitats and low densities. However, it offers us invaluable and novel information on how to correctly approach the study and conservation of this felid. Second, by describing the design and optimization of a snow leopard-specific mitochondrial, microsatellite and Y-chromosome panel, as well as its use to conduct preliminary non-invasive surveys of this felid in three areas of Central Asia, they showed how it is possible to do good science with a difficult biological model. In fact, they provided robust molecular markers that will be expected to facilitate large-scale, in-depth and non-invasive surveys to determine the status of snow leopard populations. This appears evident when the authors stated: "*The ability to rapidly obtain population samples by collecting scats* *will also facilitate population structure studies that to date have not been possible because of the inability of researchers to obtain tissue samples of wild snow leopards*". This is crucial when we learn that the authors remarked "*…a high level of scat species misidentification in the field,…Many scats identified as putative snow leopard origin were found to be from red fox*". Finally, by studying such a charismatic species, the authors have also the merit to allow readers to daydream of fascinating and enigmatic species. This is not essential for science, but it is unquestionably pleasant.

Previous Associate Editor's choice

By Darren Evans, University of Bristol

[Reproductive success of house sparrows along an urban gradient]
Peach, W. J., Vincent, K. E., Fowler, J. A. & Grice, P. V.
Animal Conservation **11**: 493- 503

"*Aren't two sparrows sold for only a penny? But your Father knows when any one of them falls to the ground.*" Matthew 10:29 (The Bible, Contemporary English Version)

For millennia, common animals such as house sparrows have lived alongside humans and have, quite literally, been considered 'two-a-penny'. In recent years however, large reductions in house sparrow populations have been reported in many European towns and cities. For example, in London, breeding numbers declined by 60% during a 10-year period from the mid-1990s. Such a rapid decline of a ubiquitous species has been a cause for concern for many city dwellers, but figuring out the reasons why has been surprisingly difficult.

For many common species, there have simply been too few empirical studies to understand why their populations are declining; house sparrows living in urban environments are a classic example. Peach *et al*.'s paper goes some way to address this by measuring the reproductive success of house sparrows along an urbanization gradient over 3 years. The authors found that poor reproductive success was associated with a number of factors such as low ambient temperatures, extremes of rainfall and even high levels of air pollution from traffic. Interestingly, reproductive failure was also linked to low aphid density (an important part of chick diet), most likely the result of widespread losses of greenery in urban environments.

Peach *et al.*'s paper received considerable media attention, which can only be good news for efforts to reverse house sparrow declines. But this paper caught my attention for another reason. It serves as an important reminder not to overlook common, everyday (and sometimes dull) animals, which are often taken for granted, in favour of the more charismatic ones. The opening quote also prompts us to consider the intrinsic value of such common species when setting our conservation priorities.

Previous Associate Editor's Choice

by Jon Bielby, Zoological Society of London

[Resistance to chytridiomycosis varies among amphibian species and is correlated with skin peptide defenses]

D. C. Woodhams, K. Ardipradja, R. A. Alford, G. Marantelli, L. K. Reinert & L. A. Rollins-Smith
Animal Conservation **10:** 409–417

The amphibian disease chytridiomycosis is thought to be a major driver of global amphibian population declines. So far it has been linked to the possible extinction of over 100 species of amphibian species worldwide. However, as yet chytridiomycosis remains relatively poorly known and understanding the variation in response to infection is proving to be a major challenge.

While some species are heavily impacted by infection, others remain apparently unaffected, being able to act as perfect vectors for the pathogen. Even within a species different populations may have different responses to infection. The impacts of the disease may vary with a number of factors including the strain of the fungus and the environment in which infection occurs. A further factor that may affect the impact of infection may be innate defence mechanisms raised by the infected species.

Woodhams et al.'s paper highlights the importance of innate immune mechanisms of a species by linking species survival to the production of anti-microbial peptides in the skin of a frog and the white blood-cell counts of those species. Via experimental infections of four species of Australian frogs, the authors found that different species have different survival rates. Further, and most interestingly, they demonstrated a correlation between that survival rate and the ability of the species' anti-microbial peptides to inhibit growth of chytrid fungus in the laboratory: those species whose peptides inhibited chytrid more successfully showed higher rates of survival.

The effects of chytridiomycosis are highly complex, making it very challenging to work out how to protect species most effectively. This paper serves as an excellent example of how we may gain a better understanding of the complexities of this host-pathogen system and better inform our conservation options.

Previous Associate Editor's Choice

by James Austin

[Translocation and early post-release demography of endangered Laysan teal]

M. H. Reynolds, N. E. Seavy, M.S. Vekasy, J. L. Klavitter & L. P. Laniawe
Animal Conservation **11:** 160–168

For decades, a popular though controversial conservation technique has been the translocations of threatened and endangered species. Its popularity stems in part from the perception of doing something positive, particularly when alternative options, such as habitat conservation or restoration, are politically or socially prohibitive. Demonstrating success in translocation efforts continues to be an elusive goal. Many translocation efforts have under-emphasize post-release monitoring, sighting expense or logistic reasons. However, the advancement of conservation efforts involving intensive approaches such as translocations from wild or *ex situ* populations requires detailed post-release monitoring in order to quantify success and to be able truly apply an adaptive approach to conservation. The study by Reynolds *et al.* is a good example of incorporating detailed pre- and post-release monitoring on translocated endangered waterfowl.

Despite the difficulty and expense of working on isolated island ecosystems, Reynolds *et al*. study represents good applied conservation science. A major aspect of translocation success is whether the initial cause of decline is first eradicated; in this case, the likely culprits are introduced mammals. Thus, a conscious decision to translocate to a mammal free island was made. During the translocation stage emphasis was placed on animal health, before and during translocation, and detailed documentation of survival and reproduction allowed for modeling projections based on two years of post-release data. Not only does their effort suggest that the established population on Midway Atoll is growing, but their efforts also provide important information to improve future translocation efforts. For example, monitoring of adult vital rates is likely to be more important than for juveniles in determining population trends, and this information may be useful for other related species. Similarly, the monitoring suggests that the Laysan teal can demonstrate a considerable amount of reproductive plasticity, and this may be a critical aspect of its apparent success. More narrowly adapted species may be much less likely to persist following translocation efforts.

As the science and policy behind similar conservation efforts continues to improve we will undoubtedly see greater success from translocations in many species. The paper by Reynolds *et al.* represents a good model for future efforts.