Carnivores: The sequel


In the seven years since the appearance of the first volume in this series (Gittleman 1989), titles on carnivores have proliferated. The results of many long-term studies have been published (e.g., Bailey 1993, Caro 1994, Kruuk 1995) that, together with recent popular works from carnivore biologists (e.g., McNutt et al. 1996, Ovsyanikov 1996), compellingly emphasize the continued threats faced by carnivores. It is not surprising, then, that this new volume has a conservation message as its underlying theme, which is introduced in a thought-provoking essay by George Schaller. As one of the "greats" of carnivore research, Schaller is well qualified to ask probing questions about the issues facing carnivore preservation and the sometimes questionable practices pursued in the name of their conservation. Snow leopard hunts, tiger bone farms, and profitable giant panda exchange schemes all come under his critical analysis. Despite this impassioned introduction, which both applauds and lambastes humankind's role in carnivore conservation, only two contributions focus on conservation biology.

Tim Clark and Richard Reading, who were both involved in the ongoing effort to reintroduce black-footed ferrets in the United States, present a detailed review (chapter 9) of efforts at carnivore reintroduction worldwide. They summarize a wide array of geographical and sociopolitical scenarios, from which they distill criteria designed to give the best chance of success to these controversial and frequently unsuccessful projects. Their recommendations are illustrated with four well-documented case studies, all of which are from North America. This bias tends to homogenize the problems, and their analysis would have benefited from a more diverse selection of examples. Obstacles facing restoration efforts in developing countries are more likely to arise from a clash with the subsistence demands of people rather than from the political struggles between the various parties actually engaged in carnivore repatriation—clearly one of the main stumbling blocks in Clark and Reading's cases. Nevertheless, their emphasis on the sociopolitical factors in reintroduction schemes is a revealing and pertinent message for workers in all settings.

The chapter that follows is a useful companion to Clark and Reading's counsel. Kenneth Johnson and a team of Chinese coworkers (chapter 10) focus on the human dimension of carnivore conservation and management in China, concentrating on its most high profile endangered species, the giant panda. A huge and rapidly growing population in China is the main threat facing pandas and other carnivores in the Republic. Despite innovative and increasingly successful policies aimed at limiting population growth, the country's vast size and the isolation of many of its regions means that human populations in rural areas and reserves—where large carnivores still occur—can grow unchecked. The impact of deforestation and demands on water resources has already led to serious negative consequences for giant pandas, and human pressure has doomed the South China tiger to probable extinction. Johnson and his colleagues' multidisciplinary approach stresses Clark and Reading's point that carnivore ecology is only a small component of the suite of issues involved in their protection.
Conservation aside, the book includes some comprehensive and elegant reviews of carnivore biology. Morphology, biogeography, and phylogeny are some of the themes for which the contributors have assembled data encompassing the entire order Carnivora to extract useful “take-home” messages. It can be an onerous task to plunge into the disparate and extensive datasets on the carnivores and distill meaningful patterns in their extraordinary morphological, behavioral, and ecological diversity. However, as in the first volume, editor John Gittleman has assembled some of the leading thinkers to tackle this unwieldy assignment, with results that are frequently complementary. For example, Lars Werdelin’s effort (chapter 17) to steer perception of carnivore ecomorphology away from traditional taxonomic constraints balances evenly with a functional analysis of spectacular dental weaponry of the extinct “megacarnivorans” (Audrone Biknevicius and Blaire Van Valkenburg, chapter 12). Similarly, two papers on carnivore genetics, one at the individual level (Matthew Gompper and Robert Wayne, chapter 13) and the other at the population level (Wayne and Klaus-Peter Koepfli, chapter 14), are united in illustrating common processes.

A few chapters, notably those discussing reproductive endocrinology in dwarf mongooses (Scott Creel, chapter 2) and spotted hyenas (Laurence Frank, chapter 3), narrow the focus slightly. The study of gregarious carnivores has yielded some of the most remarkable discoveries about mammalian behavioral ecology, and both contributions illustrate well the payoff to be had from long-term study. Although both chapters repeat already published results, this work is fascinating, and the authors have incorporated new theories on the extraordinary relationships between reproduction and behavior in the complex societies of group-living carnivores. This theme is explored subsequently by Peter Waser (chapter 8), who reviews patterns of dispersal in social carnivores; not surprisingly, dwarf mongooses and spotted hyenas are two of the six well-studied species that feature in his analysis.

Despite the themes and topics that unite the book, this volume suffers slightly from uncomfortable organization. Although the book is indeed about behavior, ecology, and evolution, its division into these subsections results in unnecessary awkwardness. For example, a thought-provoking essay by Marc Bekoff and Dale Jamieson on the ethics of studying carnivores is slotted into the behavior section, as is an analysis of the adaptive significance of coloration (Alessia Ortolani and Tim Caro, chapter 4), which is as ecological as it is behavioral. Conversely, Gus Mills’s review (chapter 6) of capture, census, and diet-study methods heads the ecology section, although it deals primarily with behavioral considerations that are important for success in carnivore field studies.

The book’s diverse assemblage of topics may have rested more harmoniously by eliminating the subdivisions carried over from the first volume. However, this complaint is minor and certainly does not diminish the quality of contributions. This book is a valuable addition to the establishment of carnivore ecomorphology and will stimulate further interest in this fascinating group. Gittleman has established a worthy tradition of assembling current research on the carnivores into a single accessible work. I am already looking forward to Volume III.

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References cited


Intra- and interspecific signaling between organisms has been known from the time of the earliest naturalists; indeed, Darwin considered signaling carefully in the development of his evolutionary ideas. With the rise of ethology and its incorporation into evolutionary theory over the past several decades, many workers have discussed the role of signals in the life and evolution of organisms, but with limited success because it was not clear how to accommodate the possibilities of false signaling and cheating. (False signals and cheating are the knowing transmission of an untrue signal from one individual to the advantage of the sender and the disadvantage of the receiver.) To a large extent, these concerns reflect the fact that evolutionists have often approached the question of signals from a theoretical viewpoint and have lacked a firm foundation in empirical analyses of actual signaling between real organisms.

In 1975, Amotz Zahavi provided a clarification for the problems of false signals and cheating that was novel and brilliant, and it demonstrated how best to approach solutions to evolutionary problems. The handicap principle, as Zahavi called this solution, states that when sending out signals, animals impose a handicap, or extra burden, on themselves that puts the individual organism in extra danger. Thus, an animal that sends such a signal clearly indicates to the receiver that it is in good physiological condition and can afford to assume the extra burden and danger. The handicap principle thus ensures that the signals sent out are honest, not false or cheating.

Perhaps more important than the actual concept of the handicap principle is how the Zahavis developed the concept. Again, the method was a simple one, but it involved much work. Basically, the handicap principle developed as an outcome of a