

Book Reviews

*Editor's note – the following review is the first non-English book to be reviewed in the Newsletter. Juan Francisco Ornelas reviews *Muchas más que plumas*, Juan Carlos Senar's new book in Spanish on avian plumage coloration. In addition to reviewing the content of the book, Ornelas considers the potential for publishing in other languages to spread the interest in Behavioral Ecology to other areas of the world. The review, in English, is followed by a Spanish summary.*

Mucho más que plumas.

Juan Carlos Senar, *Monografies del Museu de Ciències Naturals No. 2*, Institut de Cultura, Adjuntament de Barcelona, 2004, 190 pp.
ISSN 1695-8950 (paperback)

Conspicuous colors, enlarged tail feathers, and other visual signals have played a prominent role in the theory of sexual selection since Darwin (1871). Some of the most convincing studies of sexual selection have shown, by combination of field observations and experiments, that such traits improve mating success (reviewed by Andersson 1994). Birds are the most thoroughly studied group as regards visual signals, yet comparative evidence and patterns of usage of the signals incorporating phylogenetic information are scarce. In this book, Senar (2004) synthesizes research on a daunting array of topics relating the function of color in feathers beyond their utility in protection. The result is a concise and comprehensive review of the research published in English to the Spanish audience (although it is not intended to be an extensive review). The author also does a good job illustrating classical experiments (although the quality of color plates in the text is often low) and describing key methodological issues with respect to almost every conceivable functional aspect of bird feathers. Of particular value are the author's efforts in identifying weakness and strengths of experimental designs, knowledge gaps and research areas, and offering previously untested hypotheses that all together could stimulate future research.

The book comprises nine chapters and three of them comprise the core of the book. Each chapter is highly structured with specific objectives, very creative and informative subheadings, review of the literature relating to that objective, and a summary. In most cases, each chapter ends up with a photo of some of the most influential intellectuals (Burt, Götmark, Hill, Møller, Rhower, Slagsvold, Zuk) and a legend describing their most significant contributions. Chapter 1 introduces feather structure, molting, and color - mainly melanin-based coloration and carotenoid-derived coloration - as driven by three basic functions: protection against abrasion, protection against predators, and intraspecific communication. Senar then discusses these functions in

order to set the stage for the rest of the book. Chapter 2 is the heart of the book and the best-crafted chapter. Senar uses research on the transmission of signals by both the colors themselves and the color pattern to create an excellent introduction to scientific methodology and experimentation. The author explains the methods and results of well designed and elegantly executed experiments so that the reader can learn both the significant research in this field and, more importantly, to design experiments (e.g., variables, the use of controls, replication). Undoubtedly, this chapter is a must research tool for students (and researchers) planning on experimental research in behavioral ecology. Chapter 3 describes briefly the way color and color signals are typically measured, as well as feather molt. Chapter 4 addresses some of the correlations between the so-called dominance signals and age and sex. Chapter 5 is also an important chapter as it discusses many hypotheses that address sexual selection (i.e., sexually-selected traits). Again, the reader is thrilled with elegant experiments and argumentation to tease apart some of the hypotheses (and provide alternative hypotheses). Chapter 6 deals with delayed plumage maturity, including a discussion of the adaptive and non-adaptive explanations. Chapter 7 discusses *plumage coloration in terms of camouflage*, and an interesting discussion regarding plumage coloration patterns of predators. Chapter 8 discusses the potential of plumage coloration (i.e., color quality) as a bio-indicator of habitat quality. The final chapter concisely sets new directions in the field, recognizing that the evolution of plumage coloration traditionally studied as independent trajectories (i.e., one color trait), is perhaps best viewed as the product of evolutionary change in multiple potentially independent traits with multiple constraints.

With an engaging narrative, Senar has done a superb job in covering almost all aspects of color signaling in birds in 190 pages! If I had one disappointment, it would be

the use of phylogenies and the comparative method to understand the functions of color signals and feather ornamentation in a historical context (i.e., color signals are not necessarily evolutionary gains). This omission is perhaps justified by the relative lack of information in this field. Given the rich diversity of color signaling among tropical birds, there is a need for methodological research into the comparative biology and ecology of plumage coloration. There have been several noteworthy efforts to do this for some bird lineages (e.g., Badyaev et al. 2002). However, the scope of most studies about color are limited to a relatively small subset of birds, such as sparrows, finches, Old World flycatchers, swallows, chickadees, siskins, and goldfinches. This narrow focus has resulted in a somehow unbalanced view of the biology of plumage coloration. Hopefully this book will make an impact on aiding behavioral ecology research in Central and South America where some of the most bizarre and extravagant examples of bird coloration occur, specifically the complexity of iridescent plumage coloration of hummingbirds and quetzals and trogons, and colorful birds such as manakins, euphonias and tanagers. Having books in Spanish adequately distributed would also potentially increase the ease in promoting behavioral ecology research in the Neotropics.

In spite of having a mere of 190 pages of text that took me a full week to get through this book (accompanied with good coffee from the surrounding area of my hometown), the book is written in an engaged fashion. Coffee helped me to detect several typographical errors that proofreaders missed from the first to the last chapters. Nevertheless, these errors, language use (e.g., "ordenador", "coste") and common names (e.g., "luganos", it took me a while to detect the list of common names) do not detract from the value of the book. The main objective of the book is to reach a broad audience, from the general public to graduate students, newcomers and researchers interested in a dynamic research topic. I believe Senar has done an excellent job in this regard!

Summary of Review in Spanish

Colores conspicuos, plumas alargadas de la cola, y otras señales visuales han jugado un papel prominente en la teoría de selección sexual desde Darwin (1871). Algunos de los estudios más convincentes de selección sexual han demostrado, combinando observaciones de campo y experimentos, que tales rasgos incrementan el éxito reproductivo (revisado por Andersson 1994). Aunque las aves son el grupo más estudiado en lo que se

refiere a señales visuales, poco se ha hecho por incomparar evidencia comparativa e información filogenética para entender los patrones de uso de las señales. En este libro, Senar (2004) sintetiza la investigación existente sobre una serie de tópicos relacionados a la función del color de las plumas más allá del de la protección. El resultado es una revisión concisa y entendible de la investigación publicada en inglés para una audiencia hispano parlante (aunque no intente ser una revisión extensa). El autor también hace un buen trabajo ilustrando experimentos clásicos y describiendo detalles metodológicamente claves con respecto a casi cualquier aspecto funcional concebible de las plumas de las aves. De particular valor resalta el esfuerzo del autor por identificar debilidades y fortalezas de diseños experimentales y vacíos de conocimiento en áreas de investigación, ofreciendo hipótesis no probadas que en su conjunto podrían estimular futuras investigaciones.

El libro está compuesto por nueve capítulos y tres de ellos constituyen la esencia del libro. El Capítulo 2 es el corazón del libro y el capítulo mejor logrado. Senar usa la investigación sobre la transmisión de señales por el color y patrones de coloración para crear una excelente introducción al método científico y a la experimentación. El autor no solo explica los métodos y resultados de experimentos elegantemente diseñados y bien ejecutados para que el lector pueda no solo aprender sobre la investigación relevante en el campo sino para que observe como se diseñan buenos experimentos. Sin duda, este capítulo es una guía de investigación para estudiantes e investigadores que planean realizar investigación en ecología de la conducta. En el capítulo 4 explora las correlaciones entre las señales de dominancia con la edad y sexo de las aves. El capítulo 5 también es importante ya que discute muchas hipótesis sobre señales que son seleccionadas sexualmente. De nuevo el lector es provocado con experimentos elegantes y argumentación para discernir entre algunas de las hipótesis (además de ofrecer hipótesis alternativas). En el último capítulo, Senar plantea de manera concisa nuevas direcciones en el campo reconociendo que la evolución del plumaje, tradicionalmente estudiado como trayectorias independientes y univariadas, podría ser mejor visto como el producto de cambios evolutivos múltiples (multivariado) con múltiples limitaciones.

Con una buena narrativa, Senar ha hecho un buen trabajo cubriendo casi todos los aspectos sobre señales de color en aves en solo 190 páginas. Amén de algunos errores tipográficos, debo señalar dos problemas en este

campo (no necesariamente del libro): (1) un sesgo en la visión de que las señales visuales de color y patrones de coloración en el plumaje de las aves son ganancias evolutivas, y (2) que la mayoría de los estudios se han hecho en un número limitado de especies (en su mayoría gorriones y golondrinas), produciendo una visión desbalanceada acerca de la biología de la coloración del plumaje. Con una buena distribución y escrito en español, este libro de revisión podría ayudar a que la ecología de la conducta se desarrolle en los Neotrópicos donde comúnmente ocurren aves de gran colorido con plumajes y señales visualmente extravagantes. Su estudio seguramente cambiará nuestra visión y entendimiento de la evolución y función del color en aves.

Juan Francisco Ornelas

*Departamento de Biología Evolutiva
Instituto de Ecología, AC
Xalapa, Veracruz, México*

References

- Andersson M. 1994. *Sexual selection*. Princeton: Princeton Univ. Press.
- Badyaev AV, Hill GE, Weckworth BV. 2002. Species divergence in sexually selected traits: increase in song elaboration is related to decrease in plumage ornamentation in finches. *Evolution* 56:412–419.
- Darwin C. 1871. *The descent of man and selection in relation to sex*. London: John Murray.

