Why Do Males and Females Frequently Differ in Body Size and Structure?

October 8 2007

As even the most casual observer of nature knows, males and females frequently differ in body size, form and structure. But how these differences have developed – a topic studied for decades by evolutionary biologists – is not as clear.

A new scholarly book now neatly brings together the latest research findings in evolutionary biology that can help explain gender differences in a variety of organisms, including mammals, birds, reptiles, amphibians, insects, spiders and flowering plants.

Sex, Size & Gender Roles: Evolutionary Studies of Sexual Size Dimorphism (Oxford University Press, 2007), edited by UC Riverside's Daphne Fairbairn and two others, is a compendium of 20 chapters that together address intriguing questions such as why males tend to be larger than females in many large mammals, while females are generally the larger sex in smaller animals such as insects and spiders.

The book also delves in depth on how differences between the sexes can evolve in spite of substantially identical genetic material.

"In all species with separate sexes, males and females are striving to maximize their genetic contributions to future generations, but the ways of doing this vary enormously among species," said Fairbairn, a professor of biology. "We see this reflected in fantastic patterns of sexual dimorphism that we have only begun to appreciate."

The book includes numerous examples of gender differences seen in nature. For example, why female spiders are often much bigger than male spiders, and why in deer and sheep the opposite is usually true.

According to Fairbairn, who also wrote two of the book's chapters, male spiders, by being small, are adapted for searching for widely-dispersed females, while the females remain as sit-and-wait predators on their webs.

“On the other hand, in many large mammals such as deer and sheep, females and young tend to be found in areas that have high quality food or other resources,” she said. “Males are able to find groups of females in these predictable places and defend them against other males. Large males, often with big weapons such as horns or antlers, are most successful in these male-male contests.”

Fairbairn explained that in most birds males are bigger than females because their large size helps males display themselves in a more striking manner to attract females.

The book is intended for specialists in the field as well as readers with a general interest in why males and females can be, and often are, very different.

“The book’s common theme is that gender roles adopted by males and females in different species strongly influence the evolution of sex-specific sizes, forms and structures,” Fairbairn said.

Fairbairn, who joined UCR’s Department of Biology in 2001, has authored or coauthored more than 75 scientific articles and has previously edited *Evolutionary Ecology: Concepts and Case Studies* (Oxford University Press, 2001) with two other biologists.

Her next book, which she plans to write for a general audience, will focus on the many ways of being male or female in the animal kingdom.

Wolf U. Blanckenhorn of the Universität Zürich-Erchel, Switzerland, and Tamás Székely of the University of Bath, United Kingdom, are the other editors of *Sex, Size & Gender Roles: Evolutionary Studies of Sexual Size Dimorphism*.

Source: University of California, Riverside