



Book Review

Pheromones and Animal Behaviour. Communication by Smell and Taste. *By* Tristram D. Wyatt, Cambridge University Press, Cambridge, UK, xv + 391 pp., 2003, US\$100.00 (hardback), \$40.00 (paperback).

Pheromones—chemicals used for communication among animals—have become an increasing part of the scientific and public consciousness. It is not unusual for popular news sources to include updates on the status of research on human pheromones. However, reading a book like this truly brings home how much all animals, from moths to muskrats to microsmic—having small olfactory bulbs relative to brain size—humans, rely on the sense of smell and on chemical communication.

The first chapter is an introduction to the terminology and concepts of the study of pheromones. For instance, pheromone is only an appropriate reference to chemical communication within a species; a broader term for a chemical that conveys information between animals is semiochemical. There are also two appendices on chemical structure for the biochemically-impaired. However, the rather extensive vocabulary involved in the study of pheromones at both physiological and evolutionary levels leaves one thinking that a glossary would also have been useful for those who have problems keeping their kairomones, allomones, and synomones straight.

Following chapters include very extensive coverage of the role of pheromones in sexual selection, aggregation, social organization, recruitment, alarm signals, and orientation behavior. Territorial behavior is also covered, though with somewhat short attention given to the hot topics of remarking and overmarking. The role of pheromones in social organization includes both recognition mechanisms and mechanisms of either control or signaling – the jury is still out on that one - between dominants and subordinates, particularly in cooperative breeders. Great attention is also paid to the role of pheromones as honest signals of health or dominance, or by illicit signalers, such as chemical mimics, and eavesdroppers, such as egg-dumpers and predators. Throughout the book, the greatest number of examples by far is drawn from the extensive literature on pheromonal activities in moths

and in social insects such as bees and ants. However, fish, mice, and the occasional non-rodent mammal are given a mention. An additional feature at the end of each chapter is a list of books and articles for further reading on the relevant topic.

A well-illustrated chapter covers the physiological perception of pheromones, from the dual neural pathways making up the sense of smell (the olfactory bulbs and the vomeronasal organ) down to the olfactory receptors, pheromone and odorant-binding proteins, and clean-up enzymes that turn chemical signals off. Another short, but fascinating chapter details practical applications of pheromones. Pheromones are currently used primarily for management of reproduction in domestic animals and for management of insect pests. However, one can imagine all the potential business opportunities for clever biochemists and behaviorists!

One of the biggest treats is a chapter on the role of pheromones in human behavior. The author covers such time-tested topics as menstrual synchrony and mother-infant olfactory communication, as well as the more controversial topics of the role of pheromones in human mate choice and the existence or non-existence of a vomeronasal organ in humans and Old World primates. Especially fascinating is the table detailing odors associated with various human illnesses (who knew that patients with gout or schizophrenia both have differing, distinct odors to their sweat?), and a table listing various commercial products, both past and present, that contain pheromones.

The book is geared toward the advanced undergraduate or post-graduate researcher, and does a good job in reaching its target audience, although scientists might be irritated by little things such as the almost complete lack of error bars on any graph in the book. An appropriate niche might be as additional reading for a behavioral neuroendocrinology class.

Easily the greatest disappointment of the book, at least for a primatologist, is its relative lack of detailed information on pheromones in nonhuman primates. Exceptions include short discussions of reproductive suppression in callitrichids and male lesser mouse lemurs, priming effects of pheromones in various primate species, and a drawing of lemurs stink-fighting. There is small mention of the growing debate on the use of scent-marks in territorial behavior in callitrichids, and the classic work by Epple receives about two sentences.

Old World primates are covered mainly in the chapter on human pheromones, and the author relies rather heavily on Dixon's *Primate Sexuality* (1998, Oxford University Press, Oxford) rather than on primary sources for the information included. However, as an accessible and intelligent general work on pheromones, this book is invaluable. It is also rare and welcome in

its capacity for easy and readable explanation of both the proximate and the ultimate roles of pheromones in animal behavior.

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