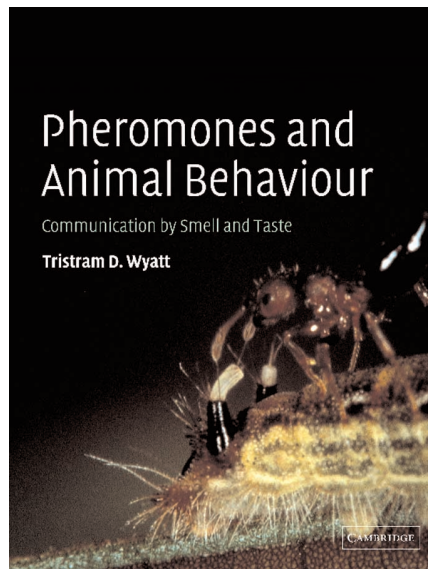


NOSE TALK



Pheromones and Animal Behaviour

Communication by Smell and Taste

By Tristram D. Wyatt

Cambridge University Press
pp. 408. ISBN 052148068X
(hbk)/0521485266 (pbk)
\$100 (hbk)/\$40 (pbk)

Wyatt's book *Pheromones and Animal Behaviour* is an excellently written account of the important, but often unappreciated, role that odour communication plays in influencing animal behaviour, including that of our own species. Due to our own comparatively poor sense of smell, we are usually unable to experience or observe this odoriferous exchange of information firsthand, but Wyatt describes in comprehensive detail what goes on literally under our noses.

This work is unprecedented in scope, spanning most of the animal kingdom from the 'lowest' invertebrates to mammals, with a size ranging from microscopic organisms to elephants. It covers a wide spectrum of odour-based interactions, from the classical examples of sex pheromones, designed to bring individuals together for mating, to the odour-mediated structuring of social groups and hierarchies. Wyatt has wisely chosen to include many aspects of intraspecific chemical communication apart from those that fit a narrow description of a pheromone, which would otherwise

exclude many significant interactions that are nevertheless heavily dependent on odour information. He also describes the whole chain of events in odour communication from the production and release of odour molecules by the senders to the reception by the olfactory system and the resulting physiological and behavioural changes in the receivers. Information about the different communication systems covered in the book is presented within both the relevant biological contexts and a solid evolutionary framework. This includes the steps that have led to the establishment of chemical communication systems and the specific benefits to both senders and receivers that are necessary for these systems to arise. The material in the book is well integrated, with its comprehension neatly facilitated by the informative illustrations accompanying the text, and the reader will probably appreciate the great effort it must have taken for a single author to cover so much ground in a way that would be hard to achieve in multi-authored works. Given the expansive scope of the book, the treatment of each topic has to be limited, especially in the number of examples given, but Wyatt still manages to go into considerable depth, and any particularly treasured references missed by the reader will not spoil the fun of the book. At the end of each chapter are some references to more specialised reviews for those who wish to probe more deeply within a specific subject.

Rather than having a taxonomical organization, the book takes a comparative view, with chapters organized by themes according to the types of interactions and/or information involved, with the aim of showing how unrelated animals have reached independent solutions in specific situations. An exception to this is our own species: information about how we ourselves may be influenced by odours is for the most part covered in a separate chapter, which is appropriate since our knowledge about human pheromones is in many cases rather more anecdotal than supported by hard-core scientific evidence. The reader interested in compiling information about specific groups of organisms may consult the index at the end of the book. The thematic organization of the book works very well due to the excellent structuring of the information; some caution may be necessary when reading about the organization of the chemosensory system, however, as it is not always obvious when information applies specifically to vertebrates or insects.

The first chapter gives an introduction to chemical communication and how it may have evolved, as well as comparing different aspects of chemical communication with other modalities such as visual or sound communication. Chapter two describes how chemical signals can be identified, including the collection and identification of specific chemicals and the use of behavioural assays to validate their effects. Chapter three extensively covers sex pheromones and their use in finding mates as well as the kind of information that they may encode, such as reproductive readiness and the quality of potential mates. Chapters four and five cover how odour signals may be used for spatial structuring of populations, i.e. how they can be used to bring individuals together or exclude them from a site, including the age-old problem of how to invite your friends to the party while at the same time keeping unwanted guests away. Chapter six covers the role of odour signals in structuring social organization and recognition of kin and nestmates. Chapters seven and eight cover recruitment and alarm pheromones and their role in bringing individuals together to exploit or

defend a resource or, conversely, to disperse in response to a threat. Chapter nine gives a helpful overview on how odours are detected and processed by the chemosensory system and the influence of this information on the endocrinology (e.g. ovarian cycles) and development of the receiver. Chapter 10 describes the multitude of strategies that animals employ to orient towards those elusive odour sources (what use is there in sensing the presence of a receptive female if you can't find her?). Chapter 11 describes the problems of illicit use of chemical signals: how other animals manage to crack the chemical code of a message and use it for their benefit to the detriment of the signaller or the receiver. Chapter 12 describes the many applied uses for our knowledge about pheromone communication. Finally, chapter 13 discusses the potential (and sometimes realised) impact that odours may have on our own biology and behaviour, all presented with a healthy dose of open-minded scepticism. Two short appendices about chemical nomenclature at the end of the book should help the unfamiliar reader to cope with the terminology used to describe organic molecules.

This book should be of great value as an introduction for anybody interested in animal communication and chemical or sensory ecology; from the undergraduate student in biology to the evolutionary biologist. Additionally, it will be very useful for any olfactory scientist or chemical ecologist seeking comparisons outside his or her own favourite model systems. As a passionate chemical ecologist myself, I may be inordinately biased to fall head-over-heels for the topics presented in the book, but less specialised friends and colleagues have agreed with me that it is well worth reading.

10.1242/jeb.00738

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