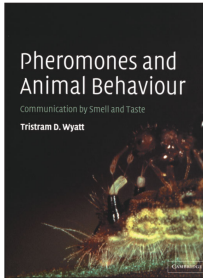


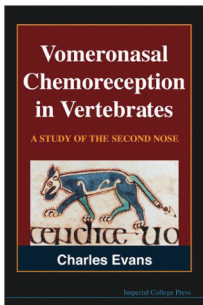
Fantastic pheromones



Pheromones and Animal Behaviour: Communication by Smell and Taste

by **Tristram D Wyatt**

Cambridge University Press, 2003
408 pp. paperback, \$45
ISBN 0521485266



Vomeronal Chemoreception in Vertebrates: a Study of the Second Nose

by **Charles Evans**

Imperial College Press, 2003
292 pp. hardcover, \$58
ISBN 1860942695

Reviewed by **Peter Mombaerts**

Life comes down to finding food, avoiding becoming food for others, and finding mating partners. Success for many involves the olfactory system, a general detector of chemicals in the external environment. Among these chemicals are pheromones, classically defined as “substances which are secreted to the outside by an individual and received by a second individual of the same species, in which they release a specific reaction, for example, a definite behaviour or a developmental process”¹.

Tristram Wyatt posits in the introduction to his book *Pheromones and Animal Behaviour* that “the design of the olfactory system makes evolution of pheromones very likely because there is selection for any odour cue that increases reproductive success or survival”. In other words, the nervous system of animals has evolved to attribute a specific meaning and formulate a specific response to many odorants emitted by members of the same species.

Wyatt demonstrates an impressive grasp of the literature and has written a most enjoyable and informative textbook (one that I read non-stop). *Pheromones and Animal Behaviour* is essentially a collection of a thousand-and-one fantastic tales of pheromones in invertebrates and vertebrates. Mother nature has used chemical signals for just about everything one can think of, including sex pheromones, aggregation and host-marking pheromones, scent marking and territorial behavior, social pheromones, recruitment of conspecifics to aid in a group response and alarm pheromones. Some species even use pheromones

‘illicitly’; for instance, certain spiders can synthesize a female moth pheromone and lure innocent male moths into their webs.

Wyatt describes each strategy and concept concisely, and the stories are richly illustrated often with original images and figures from research articles. The introductory chapter, “Animals in a chemical world” is the best overview of pheromones that I have ever come across, and worth reading by itself if you have no time or interest to read the entire book. Separate chapters cover the discovery of pheromones, perception and action of pheromones, orientation behavior and practical applications for pest control. Wyatt finally deals with the question of the importance of human pheromones, a controversial issue, but one that the author leaves unresolved. Undergraduates, graduates, postdocs and senior investigators working in diverse areas of biology will enjoy this book and find it useful.

Wyatt struggles, like everyone else thinking about pheromones, in defining precisely the role of the ‘second nose’ (a structure that has evolved in most mammals, as well as in amphibians and reptiles). The vomeronasal—or accessory olfactory—system is anatomically and molecularly distinct from the main olfactory system and is thought to be specialized for pheromone detection. That is not to say that it has a monopoly on pheromone detection; neither is it excluded from detecting ‘conventional’ chemicals that do not appear to be pheromones. Despite the molecular breakthroughs of the past decade, researchers have yet to clearly understand the different functions of the main and accessory olfactory systems.

In his book *Vomeronal Chemoreception in Vertebrates*, Charles Evans attempts to clarify the function of the vomeronasal system. Evans chronicles the discovery of the vomeronasal organ in 1812 by Ludwig Jacobson—after whom the organ is often named—and summarizes functional morphology, chemosignals, development, physiology, molecular biology and behavior. At times the information is intriguing, such as when reporting long-forgotten papers in anatomical journals, but overall Evans has written a confusing tome. With an uninviting writing style, the author uses so many abbreviations, seemingly for no good reason and often without explanation, that one wonders if the author used them in the first draft, but forgot to spell them out before the book went to print. (As an example, ‘T’ stands for testosterone, while ‘F’ stands for the Flehman response in ungulates.) The chapter on molecular biology, a field about which I can claim some expertise, is so bad that I felt compelled to excise it neatly with a razor blade from my book, and cut it into small pieces with a paper shredder. The chapter is full of misinformation that would not have survived peer review in a top tier scientific journal. Evans also makes abundant use of figures from research articles, but provides little explanation in the legends (and then there are those abbreviations again...).

It is no exaggeration that, as the teaser of Wyatt’s book claims, “[this book] is the first to cover the whole animal kingdom at this level for 25 years”. And despite its shortcomings, Evans’ book, too, is the first attempt in a long time to address the vomeronasal system specifically. Given the inherent sexiness of the subject matter, it is surprising that few comprehensive scientific books are available.

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1. Karlson, P. & Lüscher, M. *Nature* **183**, 55–56 (1959).