Editorial

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Published online: 9 September 2010
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This special issue of the *Journal of Comparative Physiology A* is dedicated to the comparative biology of pheromonal communication in vertebrates.

In the field of animal communication, olfaction is obviously the most widespread of the senses due to the fact that it has been well conserved across evolution. Among the various semichemicals involved in animal communication, pheromones constitute a subclass of molecules defined initially as “chemosignals that provide information to conspecifics about reproductive status or which stimulates species-specific social behaviors” (Karlson and Lüscher 1959). However, much more restrictive definitions have been introduced along the years. As a result, there is some controversy about the use of the term “pheromone” in vertebrates, and finding a definition for pheromones obviously has remained a difficult question.

Despite discrepancies, a common feature of all definitions is the fact that pheromones are species-specific signals. Consequently, the full diversity of pheromonal communication can be only fully understood through comparative studies using different vertebrates species facing different constraints and using different strategies and adaptations to enable their particular lifestyle in a particular habitat. Indeed, I am deeply convinced that the study of

pheromonal communication in various species offers exceptional opportunities to study various fundamental biological problems and to expand our knowledge of the evolutionary biology of olfactory communication.

This diversity is well depicted by the contributions presented in this special issue. Indeed, this issue is introduced by *Tristram Wyatt* who kindly spent some time, during the preparation of the second edition of his now famous book “Pheromones and Animal Behavior” (Wyatt 2003), to discuss the distinguishing characteristics of pheromones and signature mixtures and their perception in both vertebrates and invertebrates. After this introduction to the field, other contributions are then dedicated to depict the current status of research in pheromonal communication in each class of vertebrates. The corresponding questions and topics are first illustrated by Nicholas Johnson and Weiming Li who discuss the behavioral responses of fish to pheromones in natural freshwater environments. Sarah Woodley then reviews the literature on the current knowledge of pheromonal communication in amphibians. Following this contribution, Robert Mason and Parker Rockwell discuss the importance of pheromonal communication for the social behavior in reptiles. Contrary to what has been thought for a long time, pheromonal communication also plays a role in birds, a class of vertebrates that has long been thought to be anosmic. Accordingly, Samuel Caro and Jacques Balthazart present recent evidence for the existence of bird pheromonal communication. Finally, two contributions highlight selected aspects of pheromonal communication in mammals. First, Carla Mucignat Caretta reviews current knowledge about the mammalian vomeronasal organ in rodent species. In addition Gérard Coureaud and co-workers present a case of pheromonal communication in the context of the mother-young relationship in the rabbit. Indeed, a pheromone identified as the rabbit mammary pheromone

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so far is the best example for the existence of a mammalian pheromone as it fulfills the most stringent definitions.

As its guest editor I hope that this special issue of *JCP-A* will serve its purpose as a set of references for scientists working in the field. In addition the present collection of papers should attract the attention of other researchers working on various vertebrate species and extend their interest to pheromonal communication.

I am especially indebted to all scientists who enthusiastically agreed to contribute to this special issue of the *Journal of Comparative Physiology A*. I also thank the reviewers who worked hard helping us to reach the highest

quality standards. Finally, I gratefully acknowledge the support and interest of Friedrich G. Barth, Editor-in-Chief of this Journal, and thank the entire editorial staff for supporting the project of this special issue.

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