

Editorial

Neurosensory ecology

This special issue on Neurosensory Ecology was inspired by a Discussion Meeting organised by *The Journal of Experimental Biology* that explored aspects of sensory physiology, behaviour and ecology that are not often considered together. The review articles herein highlight how different organisms sense their world in special ways that enable them to exploit adaptive ecological and behavioural niches. Many of these sensory systems and abilities are not shared by humans.

The rationale behind this selection of topics was to provide interested readers with a very catholic view of neurosensation, ranging from some of the first sensory cells that emerge in a developing organism to the molecular evolution of ion channels that are used to transduce signals in the environment. The goal was to be wide-ranging in the number and type of senses discussed, as well as in how various senses contribute to short- and long-term changes in behaviour. The organisms highlighted in this volume cover a huge range: from developing molluscs in their egg capsules to nocturnal bees who forage at night, frogs detecting substrate-borne vibrations, and polar bears in their Arctic habitat.

The senses discussed and reviewed in this issue are truly global. For example, to navigate great stretches of open ocean, turtles make use of the earth's magnetic field, while sea birds use their olfactory

system to detect miniscule concentrations of airborne chemicals. At the other end of the spectrum, we explore how primary sensory receptors encode and relay information about an animal's environment and consider the 'costs of sensation' and why organisms are willing to absorb this cost. Insights into the evolution of sensory systems are provided by the opsin genes of butterflies and Na⁺ channels of electric fish, and we examine how the need to detect and evade predators is shared by crickets and cuttlefish but accomplished in very different ways. Finally, we look at how sensory performance changes as animals age.

Thus, this special issue celebrates a cross-disciplinary approach to understanding neurosensory ecology. We hope that these articles prove interesting and illuminating to experts and non-experts alike and that the research questions addressed by our contributing authors provide fertile ground for young scientists entering this exciting field of study.

We would like to extend our warmest thanks to all of the authors of this special issue. We also thank the editors and staff at *The Journal of Experimental Biology* for their support while putting this issue together.

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