

types that code the development of behaviour maps? Neural networks have several properties, which make them a suitable material basis for the evolution of behaviour. They are flexible enough to implement almost any behaviour map and, because of their parallel processing, they are efficient. Moreover, they have the possibility for smooth incremental changes, for instance, by progressively adding nodes or changing the connection pattern. There is not much known, however, about how specific properties of neural networks, the neurons, the synapses or the network architecture are under genetic control. So far, in most evolutionary simulation models of neural networks only the weight of connections is put under genetic control. Three examples on the evolution of communication and social behaviour are presented illustrating the potentials of evolutionary neural network modelling. As pointed out by the authors, this chapter on evolution is somewhat speculative because the subject is not well developed yet.

In the final chapter it is argued that neural networks are good models of behaviour mechanisms. Neural networks are versatile and resistant to small disturbances. They can implement many different behaviour systems: from simple stimulus–response relationships to complex hierarchical decision systems that take different sources of information into account. They are clearly capable of learning, although the biological plausibility of some learning algorithms is questionable. Realistic studies on the ontogeny and evolution of behaviour systems based on neural networks are lacking. Nevertheless, neural network models have clearly the potential to contribute to the understanding of specific aspects of the ontogeny and evolution of behaviour.

Besides several typos the book contains two unfortunate errors. On two pages (p. 109 and 130) where the concept of *regulatory states* is mentioned, the reader is referred back to section 1.2. However, this section contains no mention of regulatory states. In figure 2.8 the reader is invited to check that the two neural networks shown realize the XOR input–output map. However, the network on the left is unable to do this, unless the weight of the upper right-hand connection is changed from 1 into -1 . Apart from these minor flaws I found the book insightful. It argues convincingly that neural networks can provide a general framework for understanding the mechanisms of behaviour: from stimulus–response relationships via learning processes and ontogenetic processes to the genetic evolution of behaviour systems.

Vive la Différence: Behavioural Ecology French Style

Danchin, É., Giraldeau, L.-A. & Cézilly, F. (eds). 2005: *Écologie Comportementale*. Dunod, Paris. xxv + 637 pp., Paperback: 50.00. ISBN 2-10-005499-6.

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For those of us who teach behavioural ecology in a language other than English, it has proven difficult to find suitable textbooks in the native language of our students. Consequently, we often resort to textbooks in English. For those of us teaching in French, *Écologie Comportementale* now offers a very competitive alternative. In fact, I will argue that this book is superior to the textbooks in English most commonly used.

Écologie Comportementale comprises five parts. The first part is composed of chapters on history, background, and methods of behavioural ecology. The second part has chapters on phenotype development, resource acquisition, and habitat selection. The third part is composed of chapters on mate selection, mating systems, parental care, and offspring provisioning. The fourth part consists of chapters on group living, cooperation, and communication. The last part has a chapter on human behaviour and a chapter on the link between behavioural ecology and conservation biology. While the former was pioneered by Wilson (1975), the latter is especially topical and is rare in behavioural ecology textbooks. I have used both Alcock (2005) and Krebs & Davies (1993) to teach behavioural ecology. Given that these are the two leading textbooks in the field, I will use comparisons with these in my review.

Alcock is more expensive (75), but is clearly more aesthetically pleasing with a hard cover, many colour photographs, and colour figures. Krebs & Davies (50) is soft cover, has just a few photographs, and the figures use only two colours. *Écologie Comportementale* (50) is soft cover and entirely greyscale which, unfortunately, will facilitate illegal reproduction. Sinauer offers all the figures in graphic format on a CD to instructors that adopt Alcock, the other two publishers do not. All three textbooks propose discussion questions at the end of each chapter, with the questions in Alcock and *Écologie Comportementale* generally being more topical because the books are more recent. *Écologie Comportementale* has a few more typographical errors than the other two textbooks,

but this can be understood and forgiven because this is the first edition.

In terms of subject matter coverage, I think *Écologie Comportementale* is clearly superior to the two leading textbooks. I like how Krebs & Davies structure the information around concepts, but their textbook is dated. Alcock often structures the information around examples, which makes the logical flow of arguments less obvious. Also, Alcock's book attempts to deal with the whole field of behavioural biology and three of the 14 chapters are devoted to proximate aspects of behaviour (neurons, hormones), which are usually not covered in a behavioural ecology course. Interestingly, one of the editors of the present volume has co-edited a recent behavioural biology textbook (Bolhuis & Giraldeau 2005) that is much more comprehensive than Alcock. In terms of structure, *Écologie Comportementale* is close to Krebs and Davies; the authors use concepts to structure the information and use fitting examples to illustrate the concepts.

The main distinguishing characteristic of *Écologie Comportementale* is its comprehensiveness: I have never encountered a textbook in behavioural ecology as comprehensive. *Écologie Comportementale* is not only thicker than the other textbooks, but the text is actually denser. This is not the reflection of a lack of synthetic abilities on the part of the authors; *Écologie Comportementale* simply presents more information and in greater depth than the other textbooks. For example, it has detailed sections on heritability, quantitative genetics, cultural transmission, maternal effects, dispersal, etc. Nevertheless, a few aspects, such as aposematism or the 'war of attrition' model of group foraging, are discussed only briefly.

Écologie Comportementale is edited whereas the other two textbooks have been written entirely by the authors. Edited textbooks allow the possibility to recruit experts for each chapter, usually making the coverage more balanced and more exhaustive. On the other hand, edited textbooks are often heterogeneous in format, quality and content. This is not the case with *Écologie Comportementale* because the editors opted for a hybrid strategy: they solicited contributions from experts for each chapter, but they reserved the right to modify the text substantially. This strategy has worked very well: it produced a very comprehensive textbook that nevertheless has a strong feeling of unity. The format of the figures is somewhat heterogeneous, but this is a minor detail.

The French glossary is an excellent idea; it will standardize the translations of English terms to French, thus aiding communication and reducing confusion. The authors should stand by a single translation for each term, however. For example, 'life history' was translated both to 'histoire de vie' and to 'composante biodémographique'. Providing the English equivalent of key terms parenthetically in the text is also an excellent idea because it helps cross-referencing to the primary literature. I would even extend this further to include the English common names of species in parentheses. One inconsistency is that the titles of works are sometimes translated to French, sometimes not. I would suggest using titles in their original language of publication. While I commend the authors for their efforts to find French equivalents to key English terms used in behavioural ecology, it is surprising that in other instances they use English terms that have equivalents in everyday French. For example, 'challenge' translates to 'défi', 'pattern' translates to 'patron', 'super-glue' translates to 'super-colle'. This may go unnoticed to readers in France that are used to such intrusions, but will be a minor annoyance to readers that live where French is a minority language. Along those lines, using such wording as 'de nos régions' assumes that all readers are from France. The authors should keep in mind that French is an official language of instruction in many other areas (e.g. Canada, west Africa, north Africa).

In conclusion, *Écologie Comportementale* is a thorough, comprehensive, and up to date textbook that should be adopted by all those that teach behavioural ecology in 'la langue de Molière'. Were it to be translated well in English, colour figures and photographs added, and an instructor's CD provided, I think it would be superior to the most popular behavioural ecology and animal behaviour textbooks currently available in Shakespeare's language.

Literature Cited

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