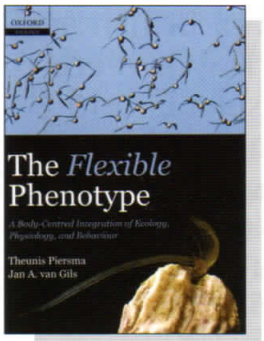


The Flexible Phenotype: A Body-Centred Integration of Ecology, Physiology and Behaviour

Theunis Piersma & Jan A. van Gils (2011) Oxford University Press, Oxford.
£65.00 (hbk)

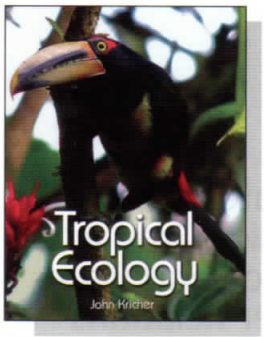
ISBN 978-0-19-923372-4

£29.95 (pbk)

ISBN 978-0-19-959724-6

Flexibility, or the capacity to respond to changes in the environment, is an important element in fitness. The term 'phenotypic plasticity' may refer to changes in individuals that occur in response to seasonal cycles, or it may relate to irreversible changes resulting from non-cyclical processes. It may involve alterations in ecology, anatomy, physiology, or behaviour. The authors examine the concept of flexibility with particular reference to migratory birds, which often encounter a wide range of environments and ecological challenges in the course of their lives. The red knot, for example, in its journey from its wintering grounds in western Europe to its breeding grounds in the Canadian Arctic loses more than half its 80g of fat. The flight is non-stop, and the refuelling prior to takeoff must take place four times a year. But not only fat is involved. Protein is built up in the form of flight muscle, while other organs are reduced to a minimum to keep excess baggage low. The bird's body thus varies in its weight and structure through the course of a year. The nature of its diet also causes changes in the bird's anatomy. In winter the gizzard of the knot increases in size because the prey organisms have a higher shell:meat ratio. When preparing for the spring migration, however, it is the liver that grows as a consequence of food selection for higher quality, i.e. more meat per unit shell. Conditions may also vary from year to year, imposing additional demands on the bird's plasticity. Then there is the stress associated with feeding young. Many birds increase their metabolic rate by four times the basic level during the heavy labour involved in filling extra guts. Behaviour must also be modified. A parent bird must decide how much food should be gathered before returning to the nest, ensuring that the time and energy spent travelling and foraging are efficiently balanced. With these and many other examples, not confined to birds, the authors demonstrate that phenotypic plasticity is the means by which physiology, anatomy and behaviour are adjusted in an individual to satisfy the immediate environmental demands. The highly accessible style of the text, coupled with the abundance of well chosen illustrations from experimental data, make this a very readable book that successfully brings home the close interaction between the environment and various aspects of phenotypic expression. It is suitable for undergraduate as well as post-graduate consumption.

Peter Moore



Tropical Ecology

John Kricher (2011) Princeton University Press, Princeton.
£59.00 (hbk)

ISBN 978-0-691-11513-9

The author of this weighty tome has already written two editions of a book with similar, but only neotropical coverage, but has completely revamped and extended his material to produce the present volume. The 565 pages of text are divided in 15 chapters and a list of references for each is given at the end. Dr Kricher admits that his personal experience is in the neotropics and within that, birds, but he has made a noble effort to cover other tropical regions, giving many examples from them. He is a little hard on the amount of research conducted in these other regions and some of his terms are rather odd. Having lived in Australia I have never associated the word 'outback' with a particular ecosystem. Similarly, especially for one so experienced in the neotropics, to say (legend to Plate 1.19) that "savannas are open areas dominated by grasses and scattered trees, particularly in the genus *Acacia*" ignores the many other tree species in areas such as the Brazilian Cerrado.

These irritations apart, there is a wealth of useful material in this well illustrated book. After the introductory overview, there is a chapter on biogeography, with good coverage of movement of tectonic plates and its implications. The next eight chapters are on tropical rain forests and are wide ranging in their consideration of such aspects as secondary