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time' forest" (p. 213), this thought-provoking book provides strong arguments for the urgent need to radically change the prevalent paradigm and practice of nature conservation in fragmented agricultural landscapes of the tropics and subtropics "away from a focus on protected areas and towards the sustainability of the larger managed landscape; away from large landowners and towards small farmers; away from the romanticism of the pristine and towards the material quality of the agricultural matrix, Nature's matrix" (p. 10).

This call for a fundamental redirection of conservation efforts clearly reflects the authors' scientific research on tropical and subtropical ecosystems and concern about social justice. Ivette Perfecto, Professor of Ecology and Natural Resources at Michigan University, has conducted research on the conservation of biodiversity, sustainable development, and political ecology in Latin America. The main research areas of her colleague and partner John Vandermeer, Professor in the Department of Ecology and Evolutionary Biology at Michigan University, are tropical and theoretical ecology, including research on the relevance of grass roots social movements for tropical conservation. Angus Wright, Emeritus Professor of Environmental Studies at California State University Sacramento, is an expert on environmental history and the social and environmental consequences of property ownership, agriculture and food security in the Americas.

Following a brief introduction (Chapter 1) and focussing on examples from Latin America, but also discussing those from Asia and other parts of the world, the authors' arguments for their conservation concept refer to ecology (Chapter 2), agriculture (Chapter 3) and the social context for understanding biodiversity, conservation and agriculture (Chapter 4). The ecological argument highlights, amongst others, the theory of metapopulation dynamics and the need to provide a high quality matrix of agricultural land that supports species migration between fragments of nature embedded in this matrix and hence contributes to ensure the biodiversity of the fragments. According to the authors, organic farming practiced by smallholders provides such high quality matrices and, above all, favours high biodiversity in the agro-ecosystem itself. The agricultural argument, however, also refers to the authors' finding that "by examining almost 300 studies from all over the world [. . .], on average, organic farms produce as much, if not more, than conventional farms" (p. 67). At the same time, the authors are aware that "growing tendencies for organic production to morph into large monocultural agribusinesses [. . .] may sometimes be antithetical to the needs of a high-quality matrix" (p. 71). Consequently, the authors state that the only way to implement high quality matrices is to collaborate with rural social movements and with smallholders struggling to attain food sovereignty. In Chapter 5, three case studies provide deepened insight into the interrelationships between agriculture, the action of socio-political forces and biodiversity in coffee, cacao and food crop agro-ecosystems. Finally, Chapter 6 recaps and puts the arguments together, and clearly reflects upon the normative consequences of the developed new paradigm on nature

conservation: "It suggests that conservation activities need to interact with the rural masses and their social movements, more than with wealthy donors" (p. 213).

I strongly recommend the book to all those who are engaged in agriculture and nature conservation in the tropics and subtropics or generally interested in a more holistic understanding of the ecological and social impacts of agriculture on the landscape to the global scale.

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**The Flexible Phenotype: A Body-Centred Integration of Ecology, Physiology, and Behaviour, T. Piersma, J.A. van Gils. Oxford University Press, Oxford (2011). 248pp., £29.95 (paperback), £65 (hardback), ISBN: 978-0-19-959724-6 (paperback), 978-0-19-923372-4 (hardback)**

Building on decades of research on migratory shorebirds and their benthic prey, the authors present a holistic and up-to-date synthesis of the flexible phenotype: a true review of the links between phenotypes and their environments. It illustrates how within-individual variation or flexibility can scale up from single organism to populations on a global scale.

In the first part of the book the basics of organismal design are introduced, which encompasses traits that have evolved for maintaining a balance of heat, water, nutrients and energy (Chapter 2), as well as economic designs (Chapter 3). It is shown how body designs avoid excess capacity, e.g. the respiratory chain is a serial alignment of organs, rather than organs inefficiently working in parallel. Next, the environment is added to the equation and metabolic ceilings (Chapter 4) and phenotypic flexibility (Chapter 5) are discussed against environmental demands. For example, barnacles (*Balanus glandula*) adaptively shorten the length of their arm, which is used to catch plankton, in more wave-beaten environments. Then the role of behaviour from an optimality point of view is illustrated (Chapter 6), followed by a more focussed review of optimal foraging within shorebirds (Chapter 7). Based on their own work, this chapter extends optimal foraging models to allow for flexible adjustments of food-processing capacities, reflected by the dynamics of organ size, energy expenditure and prey quality. In the final part a fully integrated view is attempted (Chapters 8–10). Chapter 8 hypothesizes how shorebirds balance the physiological constraints of long-distance migration and an effective immune system. This idea is supported by long-distance migrating shorebirds typically breeding and wintering in disease-free surroundings, whereas short-distance migratory shorebirds possess an immune system that tentatively allows breeding and wintering in less benign areas, such as pathogen rich freshwater environments. The second part of this chapter highlights how birds can escape predation by flexibly adjusting body composition,

such as increasing the size of their pectoral muscle. Chapter 9 shows how red knots (*Calidris canutus*) can cope with variations in prey quality between years and how that interferes with their annual cycles. In the final chapter (Chapter 10) a surprising and exciting twist leads to statements like “Nothing in evolution makes sense except in the light of ecology!”, thereby pointing out that the flexible phenotype in interaction with its environment should be central in ecology.

Throughout the book the author's use red knots as a showcase species. This is not surprising given their long research-history on this species, but besides this bird's eye view other species are used as well. Amongst others, Dutch dreamcows, Antarctic explorers, barnacles, astronauts and tarbutniks are used, thereby enhancing this book's appeal.

The text is written engagingly, where each of the ten richly illustrated and concise chapters adds more depth to the integrated story. A (very) minor critique concerns the use of humorous remarks throughout the book, which could have been omitted without loss to the joy of reading. The book is written for graduate level students and researchers in the fields of physiology, behavioural ecology, and evolutionary biology. However, due to its attractive writing and lay-out this book will also appeal to a more general audience.

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