BOOK REVIEWS


This book, written by two well-known British seed ecologists, is a revision (although not stated as such) of the successful small book Seed Ecology authored by Michael Fenner (1985). The new book contains about 2.5× more words and about 3.3× more references than the earlier version (see Preface), and page size has been enlarged from 13 cm × 21.5 cm to 17 cm × 24 cm. The Ecology of Seeds contains nine chapters, a list of 1117 references, the majority published since 1985, and a combined subject matter–taxon index. Various specialized topics are presented in eight self-contained boxes in Chapters 1.2, 3, 4, 6, and 9. Forty-eight clear, informative figures (>80% published post-1985) are scattered throughout the book, but there are only two tables. In many respects, with regard to subject matter content, The Ecology of Seeds is a condensed version of a recent book edited by Fenner (2000), which I reviewed for the Journal of Vegetation Science (vol. 12:739, 2001).

The Ecology of Seeds provides a good, up-to-date overview of the various aspects of the seed stage in the life cycle of plants, beginning with reproductive strategies, e.g., reproductive allocation and effort, seed size and number (Chapter 1), and progressing through pre-dispersal hazards, e.g., ovule abortion, resource limitation, and seed predation (Chapter 2); seed dispersal, including movements of seeds by humans and their domestic livestock and machinery (Chapter 3); soil seed banks (Chapter 4); dormancy (Chapter 5); germination (Chapter 6); post-dispersal hazards, e.g., loss to predators and pathogens (Chapter 7); seedling establishment (Chapter 8); and finally regeneration from seeds in vegetation gaps (Chapter 9). Some topics are discussed more thoroughly than others, but overall most of them are covered in enough detail to provide the reader with a good introduction to the subject.

The five classes of dormancy (following Baskin and Baskin, 2004), i.e., morphological (MD), physiological (PD), morphophysiological (MPD), physical (PY), and combinational (PY + PD), are briefly defined in Chapter 5, but essentially all of the material covered is about PD (of the nondeep level) and PY (also see pp. 80–85, Chapter 4). This is understandable since nondeep PD and PY are the most common kinds of dormancy on earth (Baskin and Baskin, 1998). Yet, in some plant communities, e.g., those of mesic habitats of broad-leaved temperate deciduous forests of the Northern Hemisphere, MPD is a common kind of seed dormancy. On page 97, the statement is made that, “In morphological dormancy the seed (emphasis mine) is immature when shed....” This may give the impression that the seed is “green” (i.e., not ripe) when it is dispersed. However, the seed is ripe (mature) when it is shed, but the embryo is underdeveloped. Thus, replacing “seed” with “embryo” would solve the problem. Also on Page 97, it may be better to say that the combination of MD and PY is not known, rather than that it is impossible. Considering that Chapter 5 is only 13 pages long, perhaps too much space (4.5 pp.) is devoted to maternal effects.

Two other aspects of dormancy discussed in this book deserve comment. One, Fenner and Thompson define dormancy as a characteristic of the seed and not of the environment. In which case, for example, light may stimulate a nondormant seed to germinate, but it does not break dormancy. I fully agree with this concept of dormancy and have subscribed to it for many years. Two, it follows, then, that dormancy is not a requirement for the formation of soil seed banks. Many seeds buried in soil are nondormant for part (because of dormancy cycling) or all of the year and thus will germinate when exposed to the right combination of environmental factors, e.g., temperature and light (see Thompson et al., 2003).

Germination is covered in considerably more detail than is dormancy. The usual factors that affect germination in nondormant seeds are discussed: temperature (constant and fluctuating), light (quantity and quality), substrate moisture, and soil chemical environment (O2, CO2, NO3, , salinity, organic compounds). The ecological role of light quality (including the low fluence, the very low fluence, and the high irradiance responses) and of fluctuating temperatures in germination, in particular, receive very good coverage. The effect of smoke on germination, a subject that has received much attention during the past two decades, is discussed in Box 6.1. The authors do not seem to be convinced that climatic warming will have much of an effect on germination, dormancy, or soil seed banks.

Two mild criticisms contained in my review of Fenner’s Seed Ecology (Systematic Botany 11: 262, 1986) were use of J.L. Harper’s classification system of seed dormancy (i.e., innate, enforced, induced) and the claim that in seeds with PY the seed coat is made water-permeable by soil microbial action and abrasion by soil particles. In the new book, Harper’s system has been replaced by that of the Russian seed physiologist M. G. Nikolaeva (see Baskin and Baskin, 2004), and the authors discuss dormancy in seeds with PY as being broken in nature by fire and by high- or fluctuating habitat temperatures that seeds are exposed to after they are brought to the soil surface, such as during plowing, or after creation of a gap in the plant canopy.

I recommend The Ecology of Seeds for students and others planning to do research in seed ecology, and to “non-seed people” who want a good overview of the subject. Reading this book will provide a person with the background to proceed further into the seed ecology literature, and the references will point him/her in the right direction to do this. This book is an excellent starting point for those interested in seed ecology.

References


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