

Book review.

Made for Each Other: A Symbiosis of Birds and Pines

by Ronald M. Lanner

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This book examines a suite of mutualisms between species of montane pines that produce large, nut-like seeds, and various corvid birds (nutcrackers and jays) that harvest those fruits, and by caching them in the ground as a larder against the hard times of winter, facilitate the regeneration of the trees. In his writing, Ronald Lanner has spun an interesting and engaging tale of natural history, ethology, community ecology, and coevolution. This fascinating story about corvids and pines hangs together extremely well, and it can be expected to show up as case material in undergraduate textbooks of ecology, ethology, and evolution. I highly recommend this readable volume to both naturalists and practitioners of the forementioned fields.

The principal protagonists of this book are the Clark's nutcracker (*Nucifraga columbiana*), a montane corvid of western North America, and the whitebark pine (*Pinus albicaulis*), whose range closely overlaps that of the bird. The pine produces heavy, wingless seeds with poor intrinsic dispersal capability, but which are extremely rich in oil and other nutritional qualities. These seeds are avidly sought out and eaten by various species of birds and mammals (including humans – this is one of the species that produces "pine nuts", which are so delectable in pestos and other gastronomic treats). The nutcracker, however, is rather specifically dependant on the pine seeds, and it has a repertoire of morphological and behavioral adaptations that allow it to harvest them more efficiently than other predators of these fruits. However, the pine receives a crucial benefit from its relationship with the nutcracker, which plans for the slim pickings of winter by creating enormous numbers of small stockpiles of pine seeds in the ground surface of open forest. Although

the nutcrackers have an astonishing ability to remember the specific locations of the thousands of individual caches that they make each year (relying on visual cues to relocate them), they do not manage to harvest all of their stashes. Many of those that survive the wintertime foraging by the nutcrackers (and by thieves of other species, including grizzly bears (*Ursus arctos*)) manage to germinate. The clumps of pine seedlings eventually develop into the multi-stemmed stands typical of the whitebark pine (of course, the stems in the clumps are not ramets – each is a unique genetic entity, developed from an individual seed). The book also examines similar relationships between other species of corvids and large-seeded pines, but the focus is on the two species just described.

I have only minor, stylistic criticisms of the book. Being an ecologist, I am rather interested in the identity of any species being discussed, and therefore found it somewhat aggravating that binomials were not consistently given along with the common names (nor was an appendix of names provided). This was particularly the case for plant and animal species that are lesser actors in the ecological dramas being described. To determine the true identity of such plants as the grouse whortleberry, the reader will have to consult another source. Also, proper scientific units were not consistently used, which will be a minor turn-off to many non-U.S. readers. Jack pine (*Pinus banksiana*), for example, has cones that are one-eighth of an inch long, and there are 250,000 of them in a pound. But what are the dimensions and numbers in units that all scientists can relate to?

Of course, these are minor criticisms. I highly recommend this charming book to a wide audience of natural scientists and naturalists, particularly those interested in symbiosis and coevolution.

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