

Plant species continually establish new populations in a wide variety of ways. Founder number and the geometrical distribution of those founders, founding site shape and size attributes, degree of isolation, as well as the density of safe sites for establishment, are just a few of the features that vary among founding episodes. Further, plant species differ extensively in life history characteristics such as pollen and seed dispersal distances, mating systems, and recruitment and mortality schedules. The ways in which such interspecific differences interact with varying founding features such as number and establishment geometry to affect the rates of growth of colonizing populations and their retention of genetic diversity remain little studied. The new research described in this book demonstrates that the interplay of a host of founding conditions can frequently produce profound differences in population expansion rates and maintenance of genetic diversity in contrasting populations that differ, often only to slight degrees, in initial founding conditions. The goals of this book are twofold. First, it serves as a user's manual for the computer program NEWGARDEN (CD provided with the book) designed to enable investigations, using computer generated populations, of population growth and genetic variation resulting from user-specified differences in initial founding conditions. Second, the book provides a series of examples that show how changing just one set of features, for example slight differences in geometric spacing among plant founders, can result in significant differences in demographic and genetic variation trajectories for the ensuing populations. This book is not only of theoretical importance, but has relevance for plant restoration projects and preserve maintenance: species with different life history characteristics will need to be managed in different ways, and NEWGARDEN can be used to develop better optimized strategies for population conservation. This book will be of interest to evolutionary population biologists and geneticists, conservation and restoration biologists, and advanced biology students interested in factors that can influence genetic variation in establishing plant populations.

Updated versions of the NEWGARDEN software and additional information will be available at <http://math.uc.edu/~pelikan/NEWGARDEN> after 15th March 2012.

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