

awards

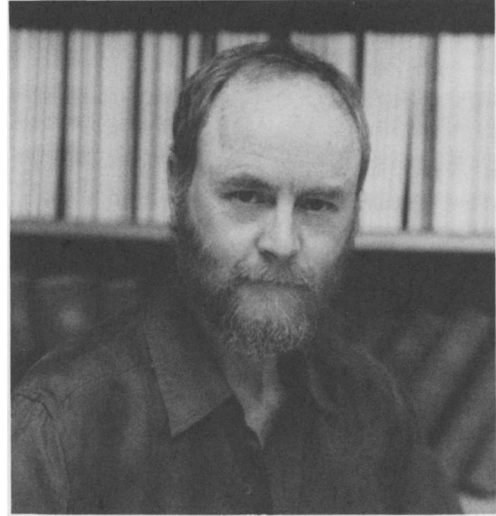
MACARTHUR AWARD

William Murdoch

William W. Murdoch has been awarded the Robert H. MacArthur Award for 1990 and 1991, which honors significant contributions to ecology by a scientist in mid-career. Dr. Murdoch was chosen as this year's awardee for his prolific research in ecology that ranges from applied to basic. His applied work has dealt with statistical assessments of modified environments, administration of environmental research, and the effects of land redistribution upon human population growth. His basic work has concerned the dynamics of predator-prey interactions.

Bill is Professor of Biology at the University of California, Santa Barbara, where he has been since 1965. His undergraduate training was at the University of Glasgow, Scotland. He earned the Doctor of Philosophy degree in 1963 at Oxford University, under the direction of Charles Elton, and came to America in that year for a postdoctoral fellowship with Francis Evans at the University of Michigan.

Two important, and quite different, publications appeared in 1966 to form the beginning of Bill's contributions to our ideas on the natural regulation of populations. Deriving from his doctoral work, "Population Stability and Life History Phenomena" (*American Naturalist* **100**:5) was a demonstration of the steadying consequences of iteroparity in a natural population of ground beetles. The second of these initial papers, "Community Structure, Population Control, and Competition—A Critique" (*American Naturalist* **100**:219) was a bold challenge to aspects of the Hairston, Smith, and Slobodkin (HSS) theories. In this paper, Bill raised a pair of issues that would become foci in ecological research in the following decade: the problems caused by inattention to testability in theory and the potentially misleading assumption that unconsumed foliage is as palatable and nutritious as that consumed by herbivores. However, the paper was not a denial of the central idea of HSS concerning carnivore regulation of insect herbivores. Bill's future work in biological control would be founded upon the fact that



parasitoids and predators can limit herbivorous insect densities to prevent food depletion and obviate interspecific competition.

"Population Regulation and Population Inertia" (1970, *Ecology* **51**:497) established one of the major themes of his lifework, weaving ecological meaning into our mathematical population theory. This paper laid a foundation for ecologically sophisticated experiments in population dynamics, where change is much of the time not clearly interpretable in terms of standard parameters. Bill's basic science has usually concentrated upon predator-prey interactions. His early influential works in this area were "Switching in General Predators" (1969, *Ecological Monographs* **39**:335), "The Functional Response of Predators" (1973, *Journal of Applied Ecology* **10**:335) and "Predation and Population Stability," with Allan Stewart-Oaten (1975, *Advances in Ecological Research* **9**:1).

Bill has been unusually successful at developing fruitful relationships with other ecologists. The tone of the Santa Barbara school of ecology has long been set by Bill's close association with Joe Connell, himself a Distinguished Ecologist laureate of the Ecological

Society. With Allan Stewart-Oaten, also of UCSB, Bill has set a high standard for statistical inference and stability analyses in population dynamics (e.g., papers on predator switching and functional response, *American Naturalist* 109:299, 111:383, 134:288, and *Journal of Animal Ecology* 59:1027). Bill's students and postdoctoral associates have achieved a very high level of professional success. These individuals include Charles Peterson, Laurel Fox, Andrew Sih, Mary Ann Scott, Jean Chesson, Peter Chesson, John Reeve, Bruce Orr, James Bence, Edward McCauley, and Sandra Walde. During the 1980s, Bill joined with Robert Luck of the Entomology Department of the University of California, Riverside, to found a now burgeoning experimental program in biological control of scale insects by parasitoids. Finally, during the past few years, mathematical physicists Roger Nisbet and William Gurney of the United Kingdom have worked with Bill, his students, and postdoctoral associates on mathematical formulations of fluctuating populations and age-class dynamics (e.g., *Ecology* 71:703, 71:716, and several papers in press).

The conceptual diversity of Bill's theoretical

research is perhaps the most interesting facet of his accomplishments. With Jean and Peter Chesson, he challenged the very basis of the long-held belief that successful biological control is to be understood in terms of mathematical stability (*American Naturalist* 125:344 and 127:696). At the same time, with John Reeve, Sandra Walde, and Bob Luck, he has done much experimental and theoretical work with an *Aphytis* parasitoid species that imparts quite stable parasitism to a scale insect host population on lemons in California (*Journal of Animal Ecology* 54:797 and 55:1069, *Ecology* 70:1700 and 70:1707).

Bill has published two "Science Citation Classics" and is a coauthor of the 1985 "President's Award" by the American Society of Naturalists. He has served well as peer review specialist on numerous panels and is frequently an invited speaker at prestigious conferences in ecology and mathematical ecology. He is presently on sabbatical at the University of Strathclyde, in Scotland.

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