

MORON, M. A. (ed.) 1993. Diversidad y Manejo de Plagas Subterráneas. Sociedad Mexicana de Entomología and Instituto de Ecología; Xalapa, Veracruz, 261 p. Paperback. Price outside Mexico US \$10.00 plus \$3.00 for shipping (by airmail) from Sociedad Mexicana de Entomología, A.C., Atención: Dr. Miguel A. Morón, Apartado Postal 63, Xalapa, Veracruz 91000, Mexico.

This book has a subtitle: Memorias de la IV Mesa Redonda sobre Plagas Subterráneas [-] 14 y 15 de octubre de 1993 [-] Instituto de Ecología, A.C. Xalapa, Veracruz, México. As the title implies, the subject is diversity and management of soil-dwelling pests, and the book is the product of authors attending a meeting. The 19 chapters, which are assembled into 3 sections, are the work of 26 authors: 13 from Mexico, 5 from New Zealand, 4 from Costa Rica, 3 from Colombia, and 1 from Brazil. Seventeen of the chapters are in Spanish, 2 in English, and each has a resumen in Spanish and an abstract in English.

Diversity, ecology, and distribution, the subject of the first section (6 chapters), deals with faunal lists and seasonality of Scarabaeidae in habitats in Mexico, Colombia, and Costa Rica. *Phyllophaga* is the most prominent genus [some of the authors treat it as a member of a family (Melolonthidae) independent from Scarabaeidae], but *Anomala*, *Ligyrus*, *Cyclocephala*, and numerous others are also considered. One of the authors also deals with *Diabrotica* (Chrysomelidae), and another mentions *Anoplischius* and *Pyrophorus* (Elateridae), with collection data on members of various other families of Coleoptera collected but not identified. The habitats sampled are by no means limited to agroecosystems.

Agricultural importance is the subject of the next section (8 chapters). Crops damaged by larvae of Scarabaeidae and considered in this section include (principally) maize, but also cassava, peanuts, sugarcane and (briefly) wheat, barley, and oats. Agricultural methods destructive to these pests are pointed out, and these include crop rotation, the use of lime, fire, and specific planting methods for seed. There also is ranking of efficacy of chemical pesticides used for control, and passing mention of natural enemies: some Carabidae and Elateridae which were seen to feed on scarab larvae, and some unidentified Staphylinidae whose role is not understood. One brief chapter deals with 8 species of Acaridae (Acarina) found among roots of various cultivated plants; five species, belonging to the genera *Schwiebia*, *Histiogaster*, *Rhizoglyphus*, and *Sarcassania*, appear to cause damage, but there are interspecific differences in feeding habits by members of *Tyrophagus*, such that while 2 species may cause damage, *T. putrescentiae* (Schränk) appears to be a fungivore.

The final section (5 chapters) is on pest management methods under development for the control of Scarabaeidae (and some Chrysomelidae). These methods range from the development of strains of maize tolerant to attack by larvae of *Phyllophaga*, *Cyclocephala*, and *Diabrotica*, through the use of pathogenic fungi (*Beauveria* and *Metarhizium*) and bacteria (*Serratia* and *Bacillus*), to the cloning of genes causing pathogenicity by *Serratia*. One chapter describes an experimental study in the laboratory showing interaction of soil type (proportion of organic matter) and the effect of *Serratia* on scarab larvae.

The pests considered in this volume are native to the areas where they cause problems. The crops considered are also, for the most part, native. This association of native pest with native crop probably explains why classical biological control is not even considered in this volume. The future seems to hold a rationalization of current agronomic practices together with plant breeding, genetic engineering, and the use of biopesticides as the methods most likely to succeed in reducing damage. An investment in the last two decades, especially by Mexico, in systematics and ecology of Scarabaeidae, is now being teamed with agronomy and insect pathology to solve a serious agricultural problem.

J. H. Frank
Entomology & Nematology Dept.
University of Florida
Gainesville, FL 32611-0620