

How to Use This Handbook

Forage and rangeland crops harbor a wide variety of injurious and beneficial arthropods. Distinguishing the members of these two ecological groups is clearly important in the management of crop pests. Furthermore, even among the injurious species, some cause little economic loss, whereas others, often referred to as key pests, cause major loss and are subject to a variety of control practices. The primary goal of this handbook is to help individuals (producers, land managers, consultants, extension personnel, researchers, teachers, and students) to identify these arthropods and to outline methods for the management of both beneficial and harmful species. The handbook is divided into four sections, “Forage and Rangeland Production,” “Arthropods and their Management,” “Injurious Arthropods,” and “Beneficial Organisms.”

The introduction at the beginning of the “Injurious Arthropods” section provides general information about arthropods that feed on forage crops as well as a description of the organization of that section. The introduction at the beginning of the “Natural Enemies” subsection of

“Beneficial Organisms” provides an overview of those arthropods that kill or harm arthropod pests. In addition to the information and keys contained in these sections, the handbook includes a glossary to define terms, as well as an index to locate organisms and major topics. A section on sources of local information provides addresses of entomology departments throughout the United States and Canada.

The scope of this handbook covers forage and rangeland crops in the United States and Canada. The wide range of topographic and climatic conditions in this geographic area results in the cultivation of a large number of plant species. Therefore, as a practical matter, this guide only focuses on the major crop species as listed in “Important Grasses and Legumes for Forage and Rangeland Production Systems.” Nevertheless, the scope of injurious and beneficial arthropods covered is broad and the general key and descriptions are suitable for many other crop species aside from forages.

Most of the handbook discusses the identification, biology, and management of the primary groups (or families) of arthropods found in forages and rangelands. Space limitations, as well as incomplete knowledge about all arthropods associated with these crops, narrowed the focus. Thus, the taxonomic keys only identify arthropods (injurious or beneficial) to the more general family or higher taxonomic groups, and the crop injury keys only describe the more typical symptoms. The injury keys point to the likely arthropod groups that cause the symptoms. The individual discussions following the keys provide guidelines for collection and identification of key pest species, as well as the arthropod groups in general. The subsequent sections describe the biology, ecology, and enhancement of beneficial groups, including natural enemies of arthropods, pollinators, and weed biological control agents.