Managing stored grain quality

by David W. Hagstrum and Bhadriraju Subramanyam

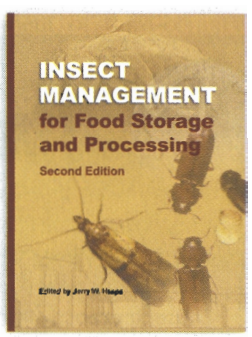
Two new books published by the American Association of Cereal Chemists International focus on pest management and other grain quality issues

Two new books on managing the quality of raw and processed commodities during storage, processing and marketing were published by the American Association of Cereal Chemists (AACC) International in 2006.

Insect Management for Food Storage and Processing, edited by entomologist Jerry Heaps, an ingredient quality manager for General Mills, was written as a desk reference with chapters on 18 topics by authors from academia and industry.

Managing Stored Grain to Preserve Quality and Value was written by Carl Reed, grain storage specialist at Kansas State University, to cover all elevator operations that can alter grain quality, with less of an emphasis on insect pest management than the other book. These books use minimal technical language, making them useful as desk references for a broad audience.

INSECT MANAGEMENT



The first edition of *Insect Management for Food Storage and Processing,* edited by Fred Baur of Procter & Gamble, was published in 1984. Although some chapter titles are similar, the second edition has been thoroughly updated. Most of the chapters in the second edition provide references for additional reading.

Chapters on integrated pest management, the role of pest management professionals, inspection techniques, insect-resistant packaging and insect mobility cover the basics of insect pest management. The mobility chapter emphasizes the importance of insect mobility in making insects difficult to manage and the diversity of environmental cues that might be used to monitor and manage pests.

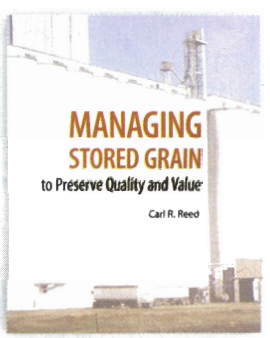
Insect monitoring and biological and physical pest management methods are discussed next, including chapters on light traps, biological control, heat treatments, modified atmospheres, irradiation and pheromone traps. In the first edition, biological control was established as a viable insect pest management method and the second edition provides recent examples of successful biological control.

The chapter on the effects of low temperatures on insects was eliminated in the second edition, but the chapter on heat treatments, which are becoming a popular alternative to fumigation, more than doubled in length. The chapter on modified atmospheres was expanded from 14 to 41 pages, reflecting the increased worldwide interest in using this method.

The book contains three chapters on chemical methods (residual insecticides, insecticide space treatments and fumigation). Fewer chemicals are now available. Information from four chapters on fumigation in the earlier edition was covered in one chapter in the second edition, an indication of the transition from reliance on synthetic pesticides to greater use of integrated pest management.

Planning and written fumigation management plans and records are emphasized more in the second edition. The book concludes with a chapter on occupational health and a summary that discusses how regulations such as the Clean Air Act and the Food Quality Protection Act have influenced the evolution of insect pest management methods. The summary also examines how insect pest management is likely to change in the future as a result of new research. The potential role of decision-support software in making insect pest management decisions is discussed.

MANAGING STORED GRAIN



Managing Stored Grain to Preserve Quality and Value begins by discussing the movement of grain through the marketing system. The next four chapters cover: 1) how grain quality is evaluated; 2) physical processes that occur during storage, such as weight distribution of grain in storage bins, flow pattern of grain, segregation of grain, foreign material and fine material by particle size; 3) insects; and 4) grain molds.

Insect and grain mold populations, and the ways they alter

grain quality are discussed. The next chapter covers monitoring. Methods of sampling grain to determine grain quality and insect density, grain grading equipment and methods, and temperature monitoring equipment are examined.

The last four chapters cover sanitation, aeration, grain drying and fumigation. These chapters discuss the most effective ways to maintain grain quality. For example, the chapter on aeration emphasizes the physics and mechanics of aeration and how managers can evaluate and troubleshoot their aeration system. Suggested readings are provided at the end of each chapter.

The challenges for both books in delivering the information that readers need to develop and implement cost-effective programs for managing the quality of stored products are: 1) that each situation is different and may require a different quality management program, and 2) that the effectiveness of a quality management program may be different each time it is used.

A sampling program is essential in determining when and what type of management is needed, and whether management was effective in preventing or correcting a problem.

Management for Food Storage and Processing and *Managing Stored Grain to Preserve Quality and Value* are each available for U.S.$169 from American Association of Cereal Chemists International (AACC). To order books, contact AACC at aacc@scisoc.org, or in Europe contact aacc@scisoc.europe.org. WG

The authors of this book review — David Hagstrum and Bhadriraju Subramanyam — have collaborated in writing Fundamentals of Stored-Product Entomology. The book examines attributes of insect pests and their natural enemies, characteristics of insect pest management methods and how these can be utilized in developing and implementing insect sampling and pest management programs or research programs that improve pest management. The book was written to help students learn to develop and implement pest management or research programs for stored-product insects, but it also is useful to anyone dealing with insect pest problems. For more information on the book, contact the American Association of Cereal Chemists International at aacc@scisoc.org or in Europe contact aacc@scisoc.europe.org.

David Hagstrum is an entomologist who has worked for USDA and Kansas State University. He can be reached at janet-david@juno.com. Bhadriraju Subramanyam is an entomologist and professor at Kansas State University. He can be reached at sbhadrir@ksu.edu.

We want to hear from you — Send comments and inquiries to worldgrain@sosland.com. For reprints of WG articles, e-mail reprints@sosland.com.