
Preface

Acarology, the study of mites and ticks, is a subdiscipline of Zoology and is many times considered in the field of Entomology (the study of insects). Mites and ticks are distributed throughout the world and inhabit almost every ecosystem (both terrestrial and aquatic). More than 55,000 species of mites and ticks are already described, and the number of undescribed species may reach about 20-fold as mite fauna in most of the world regions are still poorly explored. Mites and ticks directly affect humans as pests of different crops, fruit plants, vegetable crops and field crops; as parasites of human beings, veterinary animals, poultry and pets; as pests of stored grains and other products, mushrooms and cheese; and as parasites of honeybees. Mite infestations are responsible for economic losses worth billions of dollars in terms of reduced crop yields and lowered quality of produce. Some species of mites serve as vectors of various plant diseases. Ticks cause losses through blood feeding and by transmitting Lyme disease, babesiosis, Rocky Mountain fever, tularaemia and many other diseases among man and animals. House-dust mite allergies and tick bite allergies are also common in many parts of the world.

Our knowledge of biology, ecology and the importance of mites has largely expanded. At the same time, the actual and potential economic importance of these creatures continues to grow worldwide, and their success in colonizing the new regions makes them an ongoing quarantine threat in many parts of the world. There is a great necessity of an up-to-date compilation of basic and applied knowledge on mites and their proper management that is otherwise found scattered in a variety of languages and literature throughout the world.

The present book, *Fundamentals of Applied Acarology*, is written keeping in view nonavailability of any standard text dealing in different aspects of acarology at one place. Separate chapters in this book are devoted to the importance of acarology, historical account, acarine technology, morphology and anatomy of Acari; and feeding, development and reproduction providing knowledge on diapause and water balance. The book includes a recent classification of subclass Acari, and illustrations are provided for the identification of 107 important families of Acari. The role of mites in breaking down soil organic matter and affecting the quality of water bodies is discussed in detail. Molecular developments in relation to mites and ticks are also discussed. The role of mites and ticks in quarantines of plants and animals, forensic/criminal investigations and the importance of accidental acarophagy are also discussed in detail. Transmission of plant diseases by mite vectors is

thoroughly discussed. Safe usage of pesticides based on their mode of action (IRAC's groups), development of acaricide resistance and measures to mitigate it are also discussed.

Mite pests of fruit trees, vegetable plants, floricultural plants and field crops; mite problems in greenhouses/polyhouses; mite problems encountered under organic cultivation of plants and their management through minimum usage of pesticides are emphasized in different chapters. The role of different predaceous mites in controlling plant pests like thrips, aphids and scale insects is elaborately discussed. Biological control of phytophagous mites is discussed in detail.

Different animal parasitic mites and ticks are discussed from veterinary and medical point of view.

At the end of each chapter, many important references for further reading and electronic references (ER) in the form of YouTube links and other weblinks are given to understand fully how these tiny creatures look like and behave, feed and reproduce, the nature of damage they cause to plants and animals and measures to mitigate them. At the end, a glossary of important taxonomic and integrated pest management terms is provided which makes understanding the contents in a more suitable way creating great lust for knowing more and more about these creatures.

I am grateful to the late Dr G.P. ChannaBasavanna and Dr S.K. Gupta, both distinguished acarologists from India, who encouraged me and lent their moral support for writing such a book on applied aspects. I also sincerely acknowledge Dr Uri Gerson of Israel and Dr K. Ramaraju of India, eminent acarologists, for their useful suggestions.

The knowledge contained in the book may prove very useful for 'General and Applied Acarology' course for graduate and postgraduate levels, teachers and researchers in entomology, pest control advisors, professional entomologists, pesticide industry managers, policy planners and others having interest in mites and ticks.

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