BOOK REVIEW


As indicated in the “Preface” this manual is designed to provide a background and instruction on a broad spectrum of techniques and their application in the studies and evaluation of microbial control agents against insects and other arthropods noxious to forests and field, horticulture and orchard crops.

The editors invited 81 authors who contributed 40 chapters referring to basic studies of various groups of pathogens and their evaluation under field conditions.

SECTION I. “Introduction” (p. 3–34) contains two chapters. In Chapter I-1 “Introduction to microbial control” (p. 3–7) H. Kaya and L. A. Lacey emphasize two subjects: (a) advantages and disadvantages of microbial agents and (b) role of entomopathogens in pest suppression. In Chapter I-2 “Theory and practice of microbial insecticide application” (p. 9–34) A. C. Chapple, R. A. Downer and R. P. Bateman discuss various systems of application and droplet spectra securing proper deposition of microbials on plant surface.

SECTION II. “Statistical Considerations” (p. 36–69) contains one Chapter II.1. “Experimental design: statistical consideration and analysis” in which J. F. Campbell and S. P. Wraight provide information on how field experiments in invertebrate pathology and microbial control should be designed and the data collected, analyzed and presented.


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SECTION V. “Naturally Occurring Pathogens” (p. 265–296) contains two chapters. In Chapter V.I. “Documentation of naturally occurring pathogens and their impact in agroecosystems” (p. 267–281) D. C. Steinkraus discussed the following topics: (1) control of pests by naturally occurring pathogens, (2) a model for predicting control of Anticarsia gemmatalis populations on soybean by Nomuraea rileyi, (3) prediction of natural epizootic of Neozygites fresenii in Aphis gossypii populations. In Chapter V.2. “Assessing impacts of naturally occurring pathogens of forest insects” (p. 283–296) J. S. Elkinton and John Burand provide information on detection pathogens – Entomophaga maimaiga and their effect on populations of Lymantria dispar.

SECTION VI. “Exotic Pathogens” contains one Chapter VI. “Introduction of exotic pathogens and documentation of their establishment and impact” (p. 299–325) in which A. E. Hajek, I. D. Junior, M. L. McManus discuss such topics like: (a) pathogen selection and identification, (b) site selection and pathogens introductions, (c) releasing pathogens into the host habitat, (d) evaluating pathogen establishment and impact, (e) non-target effects, (f) cost-benefit analysis.


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In Chapter VII-11. “Microbial control of lepidopteran pest of apple orchards” (p. 527–546) L. A. Lacey, S. P. Arthurs and J. Huber discuss use of viruses, bacteria, fungi and nematode bioinsecticides and consider inoculum preparation, spraying equipment and timing and frequency of application made in orchards against various lepidopteran pests. In Chapter VII-12 “Microbial control of insect pests of stone fruit and nut crops” (547–565) D. I. Shapiro-Ilan, L. A. Lacey and J. P. Siegel discuss use of microbial control agents against e.g. Amyelois transitella, Curculio caryae, Rhagoletis indifferans using various microbial agents. In Chapter VII-13. “Application and evaluation of entomopathogens for citrus pest control” (p. 567–581) C. W. McCoy, R. J. Stuart, L. W. Duncan and D. I. Shapiro-Ilan discuss use of fungi and nematodes against Phyllocoptruta oleivora, Panonychus citri and others. In Chapter VII-14. “Small fruits” (p. 583–598) S. R. Booth, F. A. Drummond, and E. Groden discuss use of Bacillus spp., Steinernema spp., Heterorhabditis spp. against various pests e.g. Otiorynchus spp., Amathes c-nigrum, Altica sylvia. In Chapter VII-15 “Application and evaluation of entomopathogens for control of pest insects in mint” (p. 599–607) R. E. Berry discuss use of Bacillus thuringiensis, Steinernema spp. and Heterorhabditis spp. against root weevils (Otiorynchus spp.) and cutworms (Noctuidae). In Chapter VII-16 “Insect and mite control on nursery and landscape plants with entomopathogens” (p. 609–626) D. J. Bruck, R. R. Berry and J. D. DeAngelis discuss use of various pathogens against root feeders (e.g. Otiorynchus sulcatus), wood borers (e.g. Synanthedon cunicollis), defoliators (e.g. Xanthogaleruca luteola). In Chapter VII-17 “Grasshoppers and locusts” (p. 627–654) G. D. Inglis, M. A. Erlandson and D. K. Weaver provide a “Key to the pathogen groups affecting acridoids based on macroscopic and microscopic signs of diseases” and broadly discuss propagation, formulation, and application of various microorganisms against this important pest category. In Chapter VII-18 “Lawn, turf and grassland pests” (p. 655–675) M. G. Klein, T. A. Jackson, A. M. Koppenhöfer discuss use of various species of bacteria, fungi and nematodes against various target insects e.g. white grubs, mole crickets, Tipula spp., and the application techniques used at the dissemination of pathogens. In Chapter VII-19 “Application and evaluation of entomopathogens for managing insect in stored products” (p. 677–693) J. C. Lord, J. F. Campbell, J. D. Sedlacek and P. V. Vail characterize major stored pest species and provide experimental protocols for evaluation of Baculovirus spp., Bacillus thuringiensis and Protozoa against coleopteran and lepidopteran stored product pests. In Chapter VII-20 “Microbial control of urban pests – cockroaches, ants and termites” (p. 695–711) R. J. Milner and R. M. Pereira characterize pathogens of cockroaches Blatta germanica, Blatta orientalis, Periplaneta americana, Reticulitermes flavipes and Coptotermes formosanus and their use against the above pests. In Chapter VII-21 “Application and evaluation of entomopathogens for control of livestock and poultry pests” (p. 713–734) D. E. Pinnock and B. A. Mullens discuss scientific and technical problems connected with use of entomopathogens against pests of (a) extensive rangeland system and (b) pests of intensive animal husbandry systems. Overview of potential microbial control agents for manure flies or beetles is provided. In Chapter VII-22 “Microbial control of mosquitoes and black flies” (p. 735–750) O. Skovmand, J. Kerwin and L. A. Lacey discuss scientific and technical problems and equipment used in microbial control of mosquitoes and black flies using nematode Romanomermis culicivorax and fungus Lagenidium giganteum. In Chapter VII-23 “Terrestrial mollusc pests” (p. 751–765) M. J. Wilson discuss scientific and technical problems connected with use of a nematode Phasmarhabditis hermaphrodita against Deroceras reticulatum. Problems of monoxenization and DNA characteristic of this nematode are also considered.

SECTION VIII. “Transgenic plants” contains one Chapter VIII-1 “Evaluating transgenic plants for suitability in pest and resistance management programs” (p. 769–789) in which M. A. Caprio and D. V. Sumerford discuss methods preventing development of insect resistance to transgenic plants with incorporated genes from an insect pathogenic bacterium Bacillus thuringiensis.
SECTION IX. “Resistance” contains one Chapter IX-1 “Resistance to insect pathogens and strategies to manage resistance: An Update” (p. 793–811) in which A. M. Shelton, P. Wang, J.-Z. Zhao and R. T. Roush list documented cases of insect resistance to pathogens used in microbial control of plant and animal pests. Examples of such cases are listed and recommendation for avoiding resistance are provided.

SECTION X. “Non-target organisms” contains only Chapter X-1 “Guidelines for evaluating effects of entomopathogens on non-target organisms” (p. 815) in which A. F. Hajek and M. S. Goettel discuss importance of considering e.g.: (1) defining host range of applied microbial agents; (2) application strategy and non-target effects which differ by application strategy; (3) methods for non-target evaluation (laboratory, semi-field, microcosmos).

From the above concise review it is absolutely evident that second edition of “The Field Manual of Techniques in Invertebrate Pathology” provides excellent backgrounds and instructions on a broad spectrum of techniques that allow: (1) to evaluate the role of various biotic agents in natural reduction of abundance of animal and plant pests; (2) to produce and effectively use microbial pesticides based on various species of viruses, bacteria, fungi, protozoa and nematodes in biological control of plant and animal pests.

This treatise absolutely should be in every library concerning natural, medical, ecological and agricultural sciences as it provides excellent knowledge on: (1) role of microorganisms in natural reduction of various groups of invertebrates; (2) methods of collection and identification of viruses, bacteria, fungi and protozoans occurring in natural populations of arthropods and other invertebrates; (3) theory and practice of microbial control of arthropods and other invertebrates noxious from medical, agricultural and veterinary standpoint.

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